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Our New Role

For our rare visits to the "pictures" we are usually guided by the opinions of Lejeune and Dilys Powell, but *nolens volens*, we now quite frequently find ourselves fulfilling the rôle of a critic of films associated with scientific and industrial development. We have used this term to include films devoted to industrial propaganda, youth recruitment, sales promotion, accident prevention, technical tuition and documentary. The films range from severely professional to the frankly amateur. Though some are a little difficult to classify, they are, at least, all set out in an orderly fashion by a central registering authority.

Possibly, the most difficult films to produce are those which are devoted to sales promotion. Here, the producers are usually torn between an effort to tell an interesting story and trying to emphasise the quality of the goods by showing methods of manufacture and technical control. Of all films which achieved success on the "story" side, we think the one shown in connection with the Allied Ironfounders' publicity train was outstanding. For the rest, most would have been well advised to cut out this section. An example of one free from a story is that on the casting of a crankshaft made by Qualcast (Ealing Park), Limited. A second film—a very artistic production—entering this class is the one on precision casting by the Mond Nickel Company. The attempt at the superimposition of an "interest" story is liable to vitiate a sales propaganda picture through the retention of the "story" in the mind of the viewer to the partial exclusion of the true message of the film. Such methods are, of course, of use when well-balanced, and the "man in the street" is the buyer. Yet, generally speaking, these are advertisements, not propaganda.

A film which met with our full approbation—not shared by everybody—was one on motion study, of American origin. In it, there was a funny little man dashing about fetching dozens of things which should have been at his side. By the use of exaggeration it did focus attention on the extraordinary waste of time that can take place through "woolly" thinking and poor routeing. With this film, there was disclosed just how movements can be methodically analysed and cured. There is an increasing demand for "pictures" by the various technical associations. Especially do technicians like to pass judgment on films covering tuition and youth recruitment. Those available for our industry, having been favourably received, are now being extensively used by firms and groups of firms for embellishing their apprenticeship-training schemes.

Last week, we saw a pre-view of a documentary film on Atomic Physics. This, a "J. A. Rank" production, will be shown on the ordinary circuits and will fascinate those of our readers who possess a scientific training. Visual education and training through the vast variety of films now available to the industrial and technical section of the public are becoming a real aid to industry and are of increasing importance. They can, however, only be an "aid" and can never replace the age-old methods of acquiring knowledge by practical experience and suitable reading. This applies with equal force to the radio and television.

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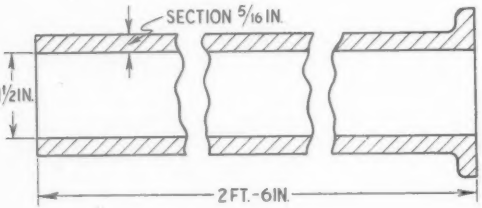
Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

To the Editor of the FOUNDRY TRADE JOURNAL

CASTING OF WATERPIPES

SIR,—We are starting the manufacture of cast-iron waterpipes. After having tried several methods of casting them, we are still having a quantity of leaky pipes. They are tested at 215 lb. per sq. in. The accompanying sketch details the castings.



We should appreciate it if any of your readers could give us any hints as to how to prevent these defects.

The pipes are green-sand moulded, and we use cores of sea sand bonded with a special core oil. The actual cupola charge is:—50 per cent. pig-iron containing C 3.65, Si 2.6, P 0.55, and Mn 0.75 per cent.; 20 per cent. cast-iron scrap; 20 per cent. risers; and 10 per cent. steel rails.—Yours, etc.,

L. C. MADEMAN.

Fonderies d'Hemixem,
42, Avenue des Tilleuls,
Hemixem, Belgium.
October 5, 1949.

To the Editor of the FOUNDRY TRADE JOURNAL

GUN METAL LINERS

SIR,—We have a problem in our brass foundry and wonder whether any of your subscribers could help in giving some solution to this problem. We are casting gun metal liners in 88, 10, 2 plus 2 per cent. lead mixture. The copper which we are using is scrap cuttings of high-conductivity copper bars and strip. The dimensions of the liners are 1 ft. 8 in. long, internal core 8½ in. diameter, outside diameter, as cast, 10 in. These liners are machined inside to form air cylinders. We use a downgate of 1½ in. diameter with a single bow runner and using an open riser 7 in. deep, starting with the thickness of the metal at the top of the liners to a dimension of 1½ in. thick at the top.

The job is cast in a dry-sand mould and core; the core has a hole through the centre 4½ in. diameter in order to make sure that the gases can get away freely from the interior. When the liners are machined, the metal appears to be sound and clean, but we are getting small holes which appear to be gas holes varying from ¼ in. to ¼ in. diameter, and these mean that the liners have got to be scrapped because the air packings have to rub on this surface when the liners are used in the machine.

We feel sure that there is a special technique for getting sound liners of this type from the foundry, and we should be much obliged if any of your readers could offer suggestions or give the precautions which are necessary to obtain the best results.

We would mention that we de-gas the metal according to the standard practice quoted by a well-known firm of specialists in this line.—Yours, etc.,

W. W. MILLWOOD,
Manager.

Resistance Welders, Limited,
Inverness.
October 21, 1949.

Forthcoming Events

OCTOBER 28.

Institute of British Foundrymen.

Falkirk Section :—"Practical Methods of Rust Prevention," by W. Montgomery, at the Temperance Café, Lint Riggs, Falkirk, at 7 p.m.

NOVEMBER 1.

Burnley Section :—"A Mechanised Foundry," by B. Malone, at the Mechanics' Institute, Manchester Road, Burnley, at 7.30 p.m.

Institute of Physics.

Scottish Branch :—"Recent Advances in Nuclear Physics," by Prof. P. I. Dee, C.B.E., F.Inst.P., F.R.S., at the University College, Dundee, at 4.30 p.m.

NOVEMBER 2.

Institution of Works Managers.

London Branch :—"Industrial Psychology," by Mrs. W. Raphael, at the Royal Society of Arts, John Adam Street, London, W.C.2, at 6.45 p.m.

Institution of Production Engineers.

Wolverhampton Section :—"The Corby Iron and Steel Works of Stewarts and Lloyds," by E. A. Taylor, M.Sc., at the West Midland Gas Board Demonstration Room, Clarence Street, Wolverhampton, at 7 p.m.

NOVEMBER 3.

Association of Bronze and Brass Founders.

Scottish Members' Meeting at St. Enoch's Hotel, Glasgow, at 12.45 p.m.

Institution of Works Managers.

Bristol Branch :—"Production Planning," by D. G. Petrie, at the Royal Hotel, Bristol, at 7.15 p.m.

Institute of Industrial Supervisors.

Smethwick Section :—"Steel" and other industrial films, at the Chance Technical College, Crocketts Lane, Smethwick, at 7 p.m.

NOVEMBER 4.

Manchester Association of Engineers.

"Oxygen in Industry and its Applications," by N. L. G. Lingwood, A.M.I.Mech.E., M.I.W., and R. E. Dore, A.M.I.Man.E., M.I.W., at the Engineers' Club, Albert Square, Manchester, 2, at 6.45 p.m.

Royal Statistical Society.

Industrial Applications Section (London) :—Symposium on "Repeatability and Reproducibility of Test Results," at the E.L.M.A. Lighting Bureau, 2, Savoy Hill, London, W.C.2, at 6 p.m.

A Modern Melting Plant

Notes on a Visit to Bamfords, Limited

By V. C. Faulkner, Hon. M.I.B.F.

The writer confesses that he derives considerably more satisfaction from visiting an old-established, yet progressive, family business than from a tour around the most ultra-modern, but more impersonal concern. At the eighty-year-old firm of Bamfords, of Uttoxeter, he found a unique combination of old tradition and modern enterprise. For instance, it was interesting to hear of one director in the past who was a great sportsman and who expressed his enthusiasm by the creation of one of the most beautiful sports grounds in the country on which many cricketing "giants," including many of the famous touring sides have played.

This ground is now used as Bamfords sports grounds, where employers and employed indulge their favourite pastime, be it cricket, football or tennis, while adjacent to the works is situated a large licensed works' club where billiards and other indoor games are provided. An excellent bowling green is laid out at the rear.

The same thought and consideration is extended to the workpeople inside the plant, where an excellent canteen provides hot meals at a very low cost, mobile tea wagons take refreshments round the shops at intervals and an up-to-date ambulance room, under a qualified nurse, and modern washing facilities are available. These amenities are the outward and visible sign of the very personal and cordial relations which exist between employers and employed—a feeling which has been fostered as a cardinal matter of policy by four generations of the Bamford family.

FIG. 1.—MAKING-UP THE CUPOLA CHARGES AT THE STOCK PILES.

The Melting Plant

However, the purpose of the visit to Uttoxeter was to record for the benefit of our readers the servicing and operation of their new cupola melting plant. Actually, there are four cupolas, a pair of 7½ tons per hour, a three and a two tons per hour. The last is used for making a special iron for grinding plates. The location of the furnaces, at the end of the shop, sites them quite close to the railway sidings and the stock piles.

The raw materials are loaded from stock into containers suspended from a 120-ft. mono-rail. Also suspended from the mono-rail is a two-ton crane weigher which automatically weighs the charges so that, as the skip passes the various piles, the charge can be built-up to carry 10 cwts. of pig-iron or scrap to yield the required composition (see Fig. 1). From the far end of the mono-rail to the cupola there is a four-inch gradient, so that the work of pushing the heavy skips along is made quite easy. In front of the cupola is a push-button-operated mobile vertical cage and the skips, entering this, rise to the charging platform (Fig. 2). Here they roll over, to discharge their contents cleanly against a swinging apron which deposits the charge reasonably centrally within the furnace (Fig. 3). Immediately after emptying, the skips automatically descend, the complete cycle taking exactly 65 secs. The whole of this apparatus was supplied by Herbert Morris, Limited, of Loughborough.

The labour necessary to service the stockyard and cupola comprises three men for a melt which at the present time is approximately 30 tons per day, but the capacity of the plant may reach 60. The cupolas, supplied by Ropers of Keighley, are of conventional design. They are 42-in. dia. and fan-blown by a 36-h.p. unit, with a 28-h.p. machine in reserve. The eight tuyeres, set in two rows, are the usual flared variety. The blast is controlled by a volume meter housed in the adjoining power house. The furnace is lined for the most part with Glenboig bricks, but these are topped by an area around the charging hole of iron bricks. The liquid metal runs into a Roper mobile receiver serving either cupola, the receiver capacity being 30 cwts. It is distributed round the foundry by bogie ladles and

shanks (see Fig. 4). Beneath the cupola is a cage for catching the "drop"; attached to the cage is a wire rope wound round a capstan used for shifting trucks along the siding. Once the "drop" is freed from the furnace, a sprinkler automatically comes into action for its quenching. The slag from the "drop" can then easily be transferred to truck for removal.

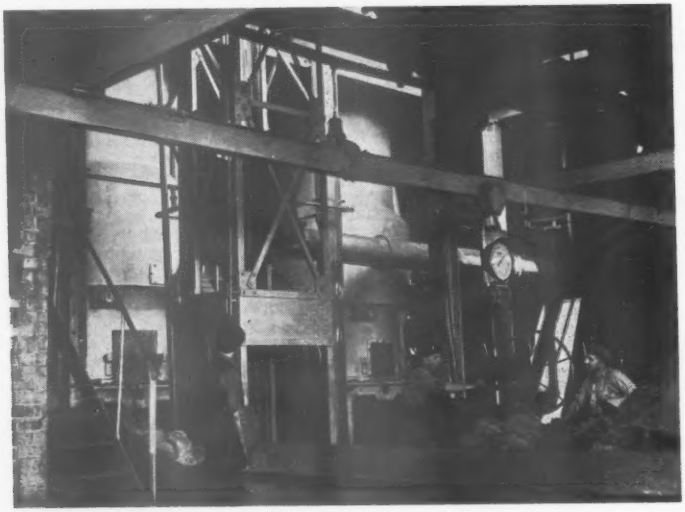


FIG. 2.—MOBILE VERTICAL HOIST FOR CHARGE SKIPS.

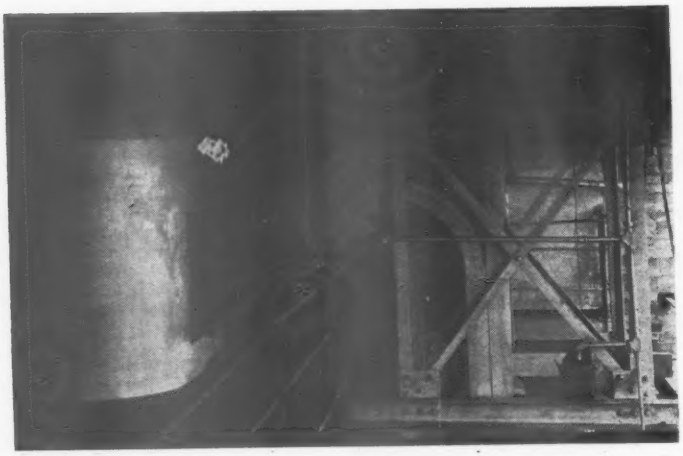


FIG. 3.—SKIPS DISCHARGING FROM THE MOBILE VERTICAL CAGE INTO THE APRON WHICH DIRECTS THE CONTENTS INTO THE CUPOLA.

The whole of the plant carries a coating of aluminium paint and looks thoroughly neat and tidy. Since its installation, the plant has been trouble-free, except once, when a power cut caused the dropping of about 8 tons of charge material. There is a satisfactory chemical control by the laboratory over the raw materials used and the material poured. This laboratory also tests and undertakes the supervision of the qualities of the sands used.

Foundry

Like all foundries of this character, mechanisation is the ultimate object, but it has to be attained by evolution. Thus, at the moment, there is a modern Pneulec sand-preparing plant, distribution being made along clean pathways by manual means. Core sand is prepared in a separate department; here, there is a simple effective sand drier, made by the Foundry & Engineering Company, of West Bromwich, based on the principle that, once dry, sand will flow freely. The actual preparation is carried out in a No. 1 August's sand mill. Moulds are made by moulding machines, including a battery of modern jar-ram-turnovers by British Moulding Machines, Limited. The moulds are knocked out on site by a night shift and use is made of Royer machines for reconditioning the backing sand. The newer steel moulding boxes have been galvanised and are giving excellent service.

The variety of the work is very great, and is subject, because the product is for the agricultural market, to seasonal pressure. The castings demand much core work, and the core shop is well serviced by a steel-band conveyor feeding an Acme continuous stove; over this conveyor is a gravity roller conveyor for returning the plates and carriers back to the operators. Cores are made by hand methods and by an Osborn blower and the

new Redford machine. Distribution is by barrow or truck.

Fettling Shop

The fettling shop is separated from the foundry by a fairly high wall. It is nicely laid-out for the castings to progress from initial cleaning to despatch. There are both a rotary-table shot-blast (see Fig. 5) and one of the rotating-drum type, together with batteries of grinders and all the usual fettling equipment. The quality of the castings is particularly high. It seems that, for certain agricultural machines, the castings have to fit accurately into the assemblies for line production, and this necessitates dimensional accuracy of a high order. In one corner of the foundry is a non-ferrous section; here one man, operating a pair of Cummings furnaces and another operating a squeeze-type machine, make hundreds of bearings of various sizes. This section has every aspect of being well organised.

It is interesting to note that, to ensure larger runs and step up production, the writer was informed that Bamfords have drastically cut down the number of their models and, whereas before the war the various sizes and types numbered over 300, they have now been brought down to round about 50. The runs are generally of such a character that a metal pattern can be made for each job. Now that most of the work is machine moulded, servicing the machines with gravity roller conveyors is contemplated.

Mr. Frank Butters, the foundry manager, to whom thanks are due for his co-operation in the preparation of this article, has the responsible task of keeping machine- and assembly-lines properly supplied, despite a demand which varies with the seasons. His first objective is to ensure and maintain a maximum of elasticity, while keeping the manual effort required to a minimum. In conclusion, the writer warmly acknowledges the courtesies accorded to him by the directors and the foundry manager during his visit.

FIG. 4.—METAL DISTRIBUTION FROM MOBILE RECEIVER TO BOGIE LADLES.

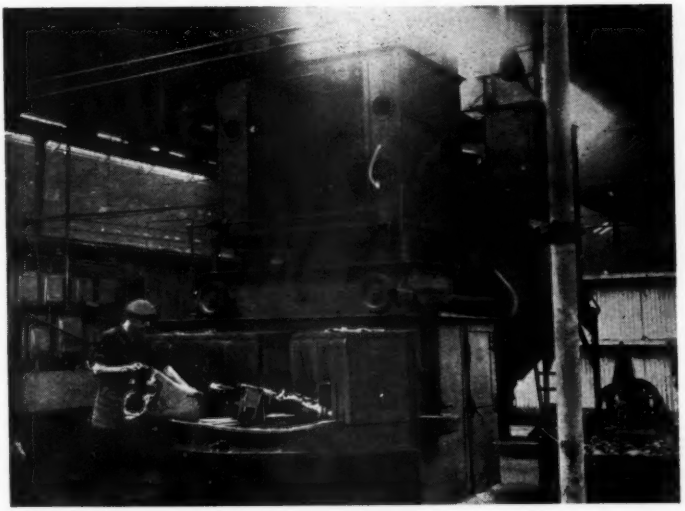


FIG. 5.—ROTARY-TABLE SHOT-BLAST PLANT IN THE FETTLING SHOP.

Book Reviews

Modern Methods for the Analysis of Aluminium Alloys. By a Committee of Chemists convened by A.L.A.R. Published by Chapman & Hall, Limited, 37, Essex Street, London, W.C.2. Price 13s. 6d. net.

Looking back a good many years, the older text-books covering metallurgical analysis were the work of one or perhaps two people. They suffered from this limitation and the reviewer finds that the wider the field from which methods are drawn, the better the final work. The book is divided into three main sections, the first covering the usual, and the second the less common elements. The third section discloses two schemes for the utilisation of photometric analysis. It is noticed that for some elements more than one method of analysis is given, yet unless there is some special reason—such as the need for special equipment or the need for greater accuracy—then only that deemed to be best should be included. The reasons for this are set out on page four, in the second paragraph. A much larger book would be needed if a dissertation on alternative methods were generally included, and such a book would be less useful to the ordinary chemist and his employer. No mention is made of the availability of standardised samples, such as are in common use in the iron and steel trades. Such standards are invaluable to the isolated chemist. Generally speaking, the "gymnastics" to be undertaken for the determination of any element are clearly set out and the reviewer believes that it will prove a boon to a host of individuals engaged on the analysis of light alloys. V. C. F.

Blacksmith's Manual Illustrated. By J. W. Lillico (3rd Impression). Published by The Technical Press, Limited, Gloucester Road, Kingston Hill, Surrey. Price 15s. net. (Inland postage 6d.)

Blacksmiths are by nature men of deeds and not words. So, too, this book is wisely arranged so that there is a maximum of illustration and a minimum of letterpress. The illustrations are particularly clear and no amount of words could increase the information they disclose. The reviewer understands that recruitment of apprentice blacksmiths is even more difficult than for moulders, yet a boy handling this book would, we feel, be drawn to a really interesting trade. Foundries possessing forges should certainly include this book in their technical libraries.

Abrasives: Their Manufacture and Use in Germany during the Period 1939-1945. Published by H.M. Stationery Office, York House, Kingsway, London, W.C.2. Price 6d. net.

The reviewer expected to find something in this publication about chilled-iron shot and the like. Instead he learnt all about grinding wheels, emery cloth, and so forth. The pamphlet condenses all the reports made by numerous teams visiting Germany, and conveys a balanced impression of the whole.

Publications Received

Floris Osmond, 1849-1912—An Appreciation. By Col. N. Belaiew. Published by "Sheet Metal Industries," 49, Wellington Street, London, W.C.2.

It is with a sense of deep satisfaction that a record of the work of that great French metallurgist, Floris Osmond, has been made by our colleague, the editor of "Sheet Metal Industries." He was fortunate in finding an old personal friend of Osmond's to write this biography, and a second contemporary, Professor Carl Benedicks, to provide a foreword. It is only right that the younger generation should be made to appreciate the work of the great pioneers of metallurgy, and the attractive form of this brochure makes the acquisition of this knowledge a real pleasure. A limited quantity is available to our readers on application to the editor of "Sheet Metal Industries," at these offices.

Handling, Storing and Transporting Aluminium and its Alloys. Published by the Aluminium Development Association, 33, Grosvenor Street, London, W.1

The light-alloy founders have long known that care must be taken in the storing of virgin aluminium. Until the publication of this pamphlet they probably had not given much thought to the problem of the finished castings. Fortunately, the rules are fairly simple, and are covered in seven lines. Often, however, founders have to handle aluminium and its alloys in forms other than castings, and in this booklet they will find a wealth of reliable information.

North-East Engineering Bureau Directory, 1949. Published by the Bureau from Guildhall Chambers, 13, Sandhill, Newcastle-upon-Tyne, 1.

This little booklet lists the names, the principal lines of goods handled, and the addresses of exactly one hundred firms on the North-East coast. A second list sets out the goods made and gives the corresponding numbers of the firms.

House Organs

Pera Bulletin, Vol. 2, *No.* 8. Published by the Production Engineering Research Association of Great Britain, Staveley House, Melton Mowbray, Leics. This bulletin consists mainly of abstracts, and foundry practice is the second on the list. The reviewer congratulates the abstractors both on their choice and on their very intelligent presentation, because one can gather from them whether or not the originals are worth consulting in relation to one's interests.

Foseco Foundry Practice, No. 97. Published by Foundry Services, Limited, Long Acre, Nechells, Birmingham, 7. A useful list of compositions of cast iron for various uses is the outstanding feature of this issue. Unfortunately, they are all unalloyed, but perhaps this will be remedied in a future bulletin.

Work of the Lake & Elliot Foundry Technical Committee*

February, 1947, *to December*, 1948

By L. W. Sanders, C. H. Kain, R. J. Hart, W. L. Hardy and J. W. Gardom

(*Continued from page* 490)

Ploughshares

Following the dry summer of 1947, a national shortage of ploughshares arose, due to the short life of shares in the very dry and hard ground. In some cases the normal life was reduced by as much as 90 per cent.,

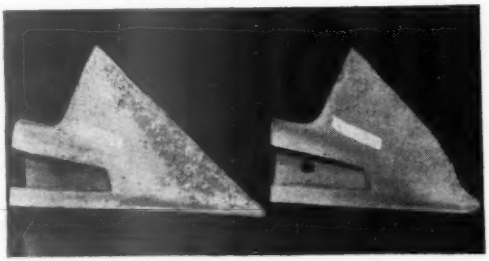


FIG. 18.—APPEARANCE OF A NEW AND A WORN PLOUGHSHARE.

and, in some districts, ploughing came to a standstill; the harvest for the following year was thus endangered. The Authors' firm was asked to make emergency supplies and rather reluctantly undertook to do so.

The first fact which impressed the Authors was that even under conditions of modern tractor-ploughing, the designs and methods of manufacture of ploughshares were exactly the same as for horse-drawn ploughs. It seems obvious that the working conditions of a plough moving at the higher speed of mechanical ploughing are more arduous than in the case of a horse-drawn plough. It would appear that this is a very fruitful field for metallurgical research.

A number of worn shares by different makers were examined. All the shares had the following approximate compositions:—T.C, 3.5; Si, 1.6 to 1.8; Mn, 0.5; S, 0.15; P, 0.17 per cent. Fig. 18 shows a new and a worn ploughshare, and Fig. 19 the microstructure at × 1,000 magnifications of the chilled edge.

*Presented at the Annual Conference of the Institute of British Foundrymen at Cheltenham Spa.

Fig. 20 shows a new and two worn ploughshares of a different design, and Fig. 21 a microstructure at 1,000 magnifications of the chilled edge on the worn share. It will be observed that in both cases the chilled edge consists of cementite with large areas of pearlite. It is suggested that, in operation, the pearlite wears away leaving the brittle cementite exposed. This breaks off and the wear proceeds.

It was decided to make trials with martensitic ploughshares in Ni-hard material and the following composition was used:—T.C, 3.08; Si, 0.526; Mn, 0.75; Cr, 1.20 and Ni 4.30 per cent. Fig. 22 illustrates the microstructure at × 1,000 magnifications, showing a wholly carbide:martensite formation. Unfortunately, shares of a different type from Figs. 10 and 12 had to be used for trial purposes, a three-furrow plough, as illustrated in Fig. 23 being used for the test. Ni-hard shares were used on the two outside points and a standard chilled-iron share on the centre point. It was found that the Ni-hard shares had more than twice the life of the chilled-iron share.

Fig. 24 shows on the left two chilled-iron shares, a new share in the centre, and on the right two Ni-hard shares. The two-Ni-hard shares lasted the full trial area of three acres, the chilled-iron shares having been changed half-way through the test. Fig. 25 illustrates the wear in another view.

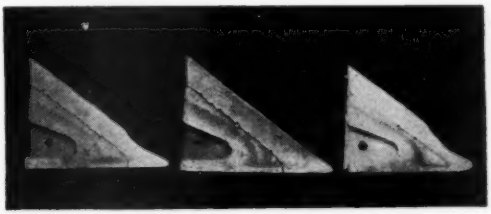


FIG. 20.—ANOTHER DESIGN OF PLOUGHSHARE, SHOWING ONE UNUSED AND TWO USED CASTINGS.

Similar results were obtained on each type of plough point used. The test is not fully illustrative of the difference in wear between the Ni-hard and chilled iron because the unworn shares hold down the worn shares in the centre, thus imposing more arduous conditions

Foundry Technical Committee Report

upon themselves. It is felt that there is urgent need for further research into the wear of ploughshares, but the present work indicates that martensitic shares have twice the life of chilled-iron shares.

Sand Reclamation

The foundries of the Authors' firm consume 3,000 to 3,500 tons of sand per year. This sand is a good sand and therefore of high price; it has to be transported to Essex, where the foundry is situated, and, additionally, there is the cost of handling—new sand into and waste sand out of the works. It was decided, therefore, to investigate the possibility of reclaiming waste sand by washing, calcining, screening, etc.

Experiments were carried out on a fairly substantial scale, using several hundreds of pounds of sand from the heap of refuse which is normally dumped. The lumps were broken down in a sand mill, tramp iron, etc., being removed by a magnet, and the sand being passed through a ¼-in. mesh sieve. The sieved sand was mixed with an alkaline solution to remove adherent clay. It was found necessary to carry out this operation either in a roller or a ball mill, as mere mixing in the solution did not remove the clay sufficiently.

After milling in the alkaline solution, the sand was washed with copious quantities of water to remove the clay silt, etc. Then, after drying, it was found that the sand still contained appreciable quantities of carbonaceous matter. To remove this the sand was calcined at 850 deg. C. This eventually removed all the carbonaceous matter, the sand then resembling new silica sand, except for a reddish tinge resulting from small quantities of iron oxide. Fig. 26 shows the untreated sand; Fig. 27 the sand after washing, and Fig. 28 the sand after calcining.

It was estimated that about 80 to 84 per cent. of sand could be recovered by this process. The plant required would consist of:—(1) A magnetic separator to separate tramp metal, etc.; (2) a water-tight roller mill to crush any lumps and thoroughly to mix the sand with an alkaline solution; (3) a washing screen supplied

FIG. 19.—MICROSTRUCTURE OF THE CHILLED EDGE OF A PLOUGHSHARE.

FIG. 21.—MICROSTRUCTURE OF THE WORN END OF A PLOUGHSHARE OF NEW DESIGN.
(ALL × 1,000 MAGNIFICATIONS.)

FIG. 22.—MICROSTRUCTURE SHOWING FULL MARTENSITE-CARBIDE FORMATION.

FIG. 23.—THREE-FURROW PLOUGH ON WHICH SHARES WERE TESTED.

with copious quantities of water; (4) a centrifuge plant to separate water and clay; (5) a rotary dryer leading into No. 6; (6) a refractory-lined kiln to calcine the dried sand; (7) a cooling tower; (8) a further separator to remover any magnetic oxides, etc., formed during calcining, and (9) finally, screens for grading the calcined sand. It was estimated that the cost of this plant would be approximately £20,000, and would require the labour of at least three men. The Authors decided that the economies to be expected would not justify expenditure on this scale.

General

Following the publication in 1947 of the "Report of the Joint Advisory Committee on Conditions in Iron Foundries," this booklet was considered along with the report of the "Dust in Steel Foundries Committee." It was decided that the best way of dealing with the problem would be to ask an independent authority to make a survey of the foundry in the light of the two reports. A consulting engineer was accordingly asked to make a survey of the foundry and to submit a report. The report, which is too long and detailed to be reproduced here, dealt with the recommendations in three sections—working conditions, amenities, processes and plant—and made proposals for attaining the recommended standards.

In order to arrive at some index of comparison, a method of scoring was devised as follows:—

Recommendation fully complied with, 2 points.
Recommendation partially complied with, 1 point.
Recommendation not complied with, nil.

The maximum possible score with this system is, therefore, twice the number of recommendations, *i.e.*, $2 \times 47 = 94$ (omitting those recommendations specifically referring to new foundries). On this basis the total score was 58 out of 94—built up as given in the following table:—

Section and recommendation.	Scoring
I. WORKING CONDITIONS.	
A. *Cleanliness:*	
(1) Washing and painting	2
(2) Periodic cleaning	1
(3) Daily sweeping	2
(4) Floor surfaces	1
(5) Use of vacuum plant	2
(6) Damping before sweeping	2
B. *Good Housekeeping:*	
(7) Tidiness and method	1
(8) Gangways	1
(9) Space round cupolas, etc.	1
(10) Outdoor storage and roads	1
(11) Safety of equipment	2
(12) Vacuum "blowing off" of patterns, moulds, etc.	0
C. *Temperatures:*	
(13) Open fires	2
(14) Minimum temperatures	1
D. *Lighting:*	
(15) Standard intensities	1
E. *Use of Colour:* No specific recommendations made in the report.	

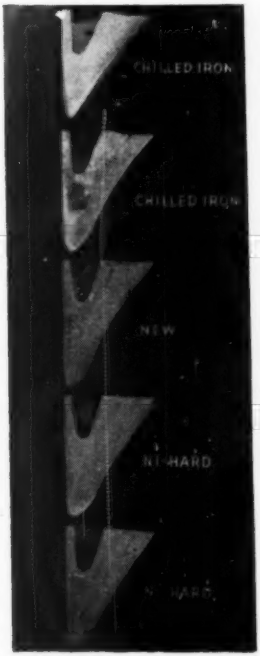


FIG. 24.—PLOUGHSHARES IN VARIOUS MATERIALS, SHOWING THE RELATIVE AMOUNT OF WEAR AFTER TESTING.

Foundry Technical Committee Report

Section and recommendation.	Scoring.
II. AMENITIES.	
F. *Washing Facilities and Cloakroom Accommodation :*	
(16) Baths	0
(17) Wash basins	1
(18) Water, towels, soap, etc.	1
(19) Housing of baths, etc.	0
(20) Changing rooms	0
(21) Lockers	0
(22) Supervision	0
G. *Canteens and Messrooms :*	
(23) Provision of	2
(24) Consumption of own food	2
(25) Warming food and water	2
(26) Prohibition of feeding in workrooms	2
H. *Welfare Supervision :* No specific recommendations made in report.	
III. PROCESSING AND PLANT.	
J. *Open Fires :*	
(27) Avoidance of	2
K. *Ladle Drying and Heating :*	
(28) Prohibition of open fires for	2
(29) Ladle drying station	2
L. *Mould Drying :*	
(30) Prohibition of open fires for	2
(31) Sufficient capacity	2
M. *Mould and Core Stoves :*	
(32) Design and Construction	2
(33) Flues and stacks	2
(34) Exhaust of fumes after drying	2
(35) Maintenance of flues, etc.	2
(36) Operatives responsibility *re* fumes, etc.	2
N. *Core Bonds :*	
(37) Removal of fumes	0
O. *Easing of Castings :* No specific recommendations made in the report.	

FIG. 25.—WEAR ON PLOUGHSHARES OF VARIOUS TYPES.

Section and recommendation.	Scoring.
P. *Knock-out :*	
(38) General ventilation	1
(39) Damping	1
(40) Good housekeeping and cleanliness	1
(41) Local exhaust in mechanised foundries	0
(42) Heavy and jobbing foundries	0
(43) Light foundries	0
(44) Alternatives to above recommendations	0
Q. *Dressing Operations :*	
(45) Suitable buildings	2
(46) Segregation	2
(47) General ventilation	1
R. *Dust and Fume Removal*	No specific recommendations.
S. *Health*	
T. *Noise*	

This method of scoring is very rough, but does allow a quick comparison with other foundries. It must be remembered that the report covers all iron foundries, and it is hardly likely that every foundry can conform in detail, *inter alia,* with recommendations: (41) for mechanised foundries, (42) for heavy and jobbing foundries and (43) for light foundries. Also, the present survey covers both iron and steel foundries.

Considering the action necessary, the recommendations were divided into three groups:—

(1) Those complied with or not applicable. (These amounted to 16 of the 47.)

(2) Those which could be given immediate attention, and put into effect with no delay or capital expenditure.

(3) Those requiring substantial capital expenditure. (These amounted to 14 out of the 47.) Some recommendations appeared both in the second and third groups.

The survey showed that while natural lighting was very good, artificial lighting fell short of the recommended standards. This was quickly corrected, but entailed an additional load of 47 kilowatts. It was decided also to streamline both steel and iron fettling shops and to remove all dust filters and dust-collecting apparatus to the outside of the building. This will involve very considerable capital expenditure.

The fact that the iron foundry is producing more than three times the amount for which it was originally designed, makes knocking-out rather unpleasant. Here again, it was agreed to remove the knock-out to the outside of the building and to replace the vibratory screens with rotary screens, as it is thought that this will produce less dust.

With respect to canteen amenities, the existing facilities are good, but no showers, lockers or changing-rooms are provided, other than rather elementary arrangements for the furnacemen. Considerable expenditure will be necessary to cover the requirements of the whole foundry, and a number of alternative plans have been prepared by the consulting engineer. An important point to be decided is whether to have the facilities concentrated in one place or whether, in view of the size and arrangements of the foundry departments, to have separate arrangements for each section. In smaller works the former method would be the obvious one, but in this case the second method has attractions.

Dust in Steel Foundries

The arrangement of the "Report of the Committee on Dust in Steel Foundries" is rather different from that of the Joint Advisory Committee on Conditions in Iron Foundries, but the summary of recommendations on pages 13 to 15 appears to entail 23 recommendations in all.

The survey reported that all the recommendations are fully complied with except:—

III. *Silica Paint*

"The use of paints containing free silica on the surfaces of moulds or cores should be prohibited as soon as sufficient quantities of suitable alternative non-siliceous materials are available." The majority of the steel castings are made in green sand, and on the few dried moulds zircon paint is usually employed, but silica paint is still used for some of the cores.

Page 15 (*b*):—

"In order to facilitate compliance with Clause 4 (*b*) of the "Precautions," every endeavour should be made to locate "blasting" apparatus near the outside walls. Particular attention should be given to this whenever new plant is to be installed." It has not yet been possible to locate "blasting" apparatus against outside walls, and very great difficulty will be found in doing this.

Page 15 VI:—

"Suitable respirators should be provided for and worn by fettlers and dressers of steel castings." The Authors are not yet fully satisfied with any respirator examined, although several types are in use.

In concluding this section the Committee wish to place on record their thanks to Mr. O. L. Pollock who carried out the survey discussed above.

Other Items

Some work has also been carried out on steelmaking, descaling of steel castings, crack detection, etc., die casting and the ever-present problems of gating and feeding. Several unsuccessful attempts have been made to devise a satisfactory method of investigating the behaviour of sand at molten-metal temperatures.

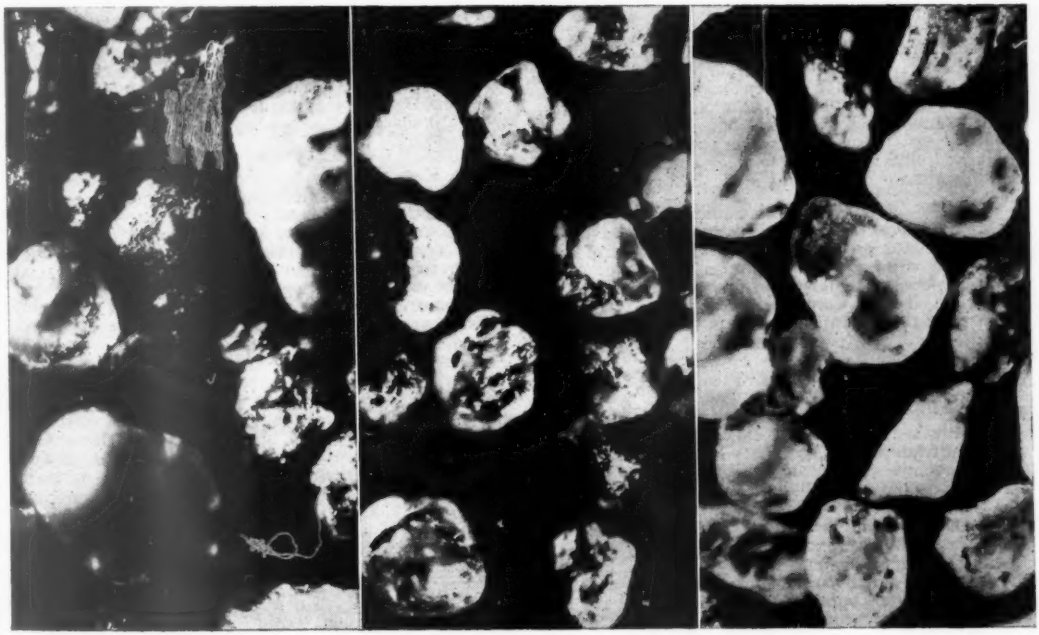


FIG. 26.—SAND USED FOR EXPERIMENTS. UNTREATED.

FIG. 27.—SAME SAND AS FIG. 26 AFTER WASHING.

FIG. 28.—SAND AFTER CALCINING.

(ALL × 50 MAGNIFICATIONS.)

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Conclusion

Although none of the above work should be regarded as finalised, the Authors feel that the problems discussed illustrate clearly the need for a very broad-minded approach to all foundry problems. The Authors wish to express their thanks to the directors of Lake & Elliot, Limited, for permission to publish this Paper and to members of the company's staff for assistance in its preparation.

DISCUSSION

Opening the discussion, MR. R. F. COATES said there was one aspect of the Paper which interested him very much, and that was the final part dealing with conditions in foundries. He felt that the manner in which the Committee had faced up to the problem of measuring its existing standards against those recommended in the Garrett Report was one to be highly commended. The Committee's report would provide an incentive to bring about improvements in conditions with consequent benefits to personnel and, following upon that, to production.

MR. JOHN BOLTON said he wished to thank the Authors for their Paper which covered a wide field. He had been privileged at one time to attend a meeting of this Committee and had been very impressed by the keenness of the members and the close liaison between departments which resulted from its activities. He believed that the working of such a committee led to improved efficiency in the foundry and was worthy of consideration by other firms in the industry.

Sand Reclamation

MR. GREAVES said he was very interested in the Paper. It was an example of foundry control as it should be. The point which struck him was the use of the resin-bonded sand. When speaking of sand reclamation, did the Committee mean that all sand that went through the works plant was lost, and that they had to make new sand all the time? On page 7 of the Report it was stated that it was difficult to obtain a good strip of the mould. Did that mean to strip the pattern from the mould?

MR. SANDERS, replying, said they discontinued the use of resin-coated sand because the raw materials were not readily available. They originally started with Scandinavian resin and when they went on to full-scale production they received American resin which was not the same—it had a much lower melting point. In Scandinavia, where there were plenty of resins, they found what they were looking for. But they found all manner of difficulties put in their way by the Board of Trade, and it actually took three months to get 32 lb. of resin into the country. Until that position resolved itself he felt they could not go much further in that direction.

With regard to the question of stripping, in the Paper they referred to stripping castings from the sand and not stripping from the machine. It was a fact that with the resin-bonded sands the strip was perfectly clean. The casting left the mould without any adhering sand, and that, he thought, was what they meant by "stripping perfectly." Sand reclamation was an effort to reduce sand consumed. In the ironfoundry they made 2,251 tons of castings and used 1,691 tons of stand including core sand. That sand had to be handled into the foundry and had to be shovelled out and taken to the dump. They were making experiments with dump sand at the back door of the foundry with a view to reclaiming it instead of dumping it.

MR. GREAVES asked was there any tendency for scour with the sand?

MR. SANDERS replied that there was none whatever. It was the most scour-free sand they had ever used.

Whirl-gate Practice

A MEMBER asked for information. He had noticed that the Authors were very familiar with the whirl-gate head for steel casting and the atmospheric feeder. Had they any information on the use of that type of feeder for grey iron, and particularly on heavy section where one needed a very dense material?

Another point on which he would like information was in connection with ploughshares. He understood from what he had heard that the object of the chilled-iron share was that one had one chilled face and a grey-iron face. The grey iron wore away more quickly than the chilled face, which made the share self-sharpening. He had looked at the illustrations and it did not seem to happen. Had they made any experiments with the Ni-Hard share in a completely white state throughout?

Ploughshares

MR. KAIN said they had experimented with the whirl gate and atmospheric technique in grey iron as well as steel. The foundry did not make very heavy castings—half a ton, perhaps, and sections of 1½ in. to 2 in. They regarded them as being quite heavy, but they did use the same system of feeding with the whirl gate and the atmospheric type of head, exactly as in the steelfoundry, and they found it very satisfactory.

They were not agricultural engineers and were only forced into that field by circumstances, and so did not profess to be expert. The idea of the chilled face and the grey back was that the back wore away and left the chilled face, making it self-sharpening—but it did not work well in practice. The trouble was that the point blunted and the tip then "rode out of the ground." The illustrations showed that the plough lips were worn only slightly, but they could not be used because the point was round and the tip "rode out of the ground." The ideal was a self-sharpening ploughshare which would pull itself into the ground all the time. They made some experiments of chilling one face to form austenite that would wear away and leave the martensite, but the results were not very successful. All the shares that they had worked with were martensitic Ni-Hard right through, and their life was at least double the life of the ordinary chilled-iron share. The chill was after all about half pearlite and half cementite. The pearlite just rubbed away and left the brittle cementite exposed; that broke away and the wear continued.

MR. JOHNSON asked had the Committee found that the whirl-gate or atmospheric type of head was more susceptible to variations in steel-making practice, and was any particular method of steel-making which tended to give improved feeding known?

High Temperatures and Gating

Dealing with this question, MR. KAIN said they had not mentioned steel-making. The expression that had been used was "steel temperatures." They were not aware of any difference in steel-making technique which affected the feed properties, but undoubtedly the whirl-gate head was very sensitive to minor temperature variations. In the past they had always tended to pour steel as cool as possible in order to get a better skin and prevent burning-on, and to provide very large gravity feeders for feeding purposes. One of the defects of the whirl-gate head was the encouragement it gave to reduce the size of the head to increase the yield of castings. It was very important that the temperature should be sufficiently high to enable the feeder to feed. One difficulty was that the management was not yet used to handling very hot steel. They had always tended in the past to pour steel too cold and, secondly, they had tended to reduce the whirl-gate type of head too much in order to get a bigger yield. The difficulty was in forming a balance between the two.

MR. JOHNSON asked further whether Mr. Kain would tell them if he had reached any optimum temperature for the use of the whirl-gate head?

MR. KAIN replied they had not. All he could suggest was as hot as possible.

Metering Compressed Air

MR. BOLTON said that reference was made in the introduction of the Paper to the metering of compressed air. He had found that the cost of compressed air was high and that it represented a large proportion of the power requirements of an average mechanised foundry. When it was used for a number of different purposes he wondered how it was possible to meter it. Was the power input per hour or per day to the compressor motor taken, or was a meter used for assessing leakages when the plant was not running?

A second point was the mention made by the Authors that phenol resin was preferable as a core-binder to urea because of the offensive smell from the latter. Was the meeting prepared to allow this statement to pass unchallenged?

Phenol and Urea Bonds

MR. KAIN said with regard to compressed air the main cost in the power used to drive the motor which drove the compressor. They had a recording meter which gave the total output of the compressor to the main distribution line with a meter on each secondary line. They divided up the cost of power according to the records shown by each of the meters and charged the departments accordingly. When first installed he feared the meters might interfere with the free flow of the compressed air, but it was found that it was not so, and the compressed air could be metered quite successfully.

With regard to trying to find leaks when the plant was not running, they all knew what it was like when they started up on Sunday morning. It was almost impossible to identify individual leaks. Mr. Bolton had asked why they preferred phenol to urea. They knew that urea made good cores, but they objected to the terrible smell which came from it. It was almost unbearable, and anyone who had smelled it would realise why they went on to phenol. Most of the published literature at the time dealt with urea and only a small amount of technical matter was coming through about phenol, but phenol had many applications in the core shop, and for that reason, and primarily on the smell question, they preferred phenol.

THE CHAIRMAN (Mr. J. J. Sheehan) said he could not let the urea smell question pass without comment. He estimated that they used at Coneygre Foundry about a ton of urea formaldehyde resin a week, and they were complimented on the absence of fumes in their foundry. He could not understand that it should be considered a nuisance. There was a slight concentration of the formaldehyde just as the cores came out of the baking oven, which was not very disagreeable fume than the old dextrine combination, and the castings themselves there was very much less disagreeable fume than the old dextine combination, and the atmosphere was very much clearer. That was not a criticism of the Paper presented, but was only an indication of their own particular practice. The committee was now tackling problems in the only way in which research could be done—by team work. The most interesting thing in the Paper to him was the fact that they were anticipating their President's Address and were tackling the amenities on a scientific basis. He sincerely felt that they had in the Institute the possibility of an extension of the technical committees to the humanities, and the Paper was a working example of it.

Co-ordinating Research

DR. REES said he had been specially interested in the phrase used by Mr. Kain in the Paper with regard to the very large amount of overlap which was evident in the number of committees investigating precisely the same problems. He thought it was high time there was formed a co-ordinating committee which could undertake a certain amount of pooling. They had committees of the British Steel Founders' Association and the I.B.F. and various works committees all investigating the same problems. He did not suggest that overlapping should be completely eliminated: it could be advantageous, but it could go to excessive limits, and he thought the suggestion which Mr. Kain had made was well worth while pursuing.

He was particularly interested in the work on coated sand because there, he thought, a very considerable improvement in foundry sand was envisaged, and he hoped the difficulties which had been met in obtaining supplies of the right type of resin would soon be overcome.

Foundry Technical Committee Report

As a member of the Dust in Steelfoundries' Committee from its inception he had been interested to see that some use was being made of the conclusions advanced by that committee.

Respirators

Certain advances were possible, he thought, in the near future with regard to the point raised by Mr. Lain on the production and use of a suitable respirator. He believed that a much improved respirator, which was reasonably efficient and which was not uncomfortable to wear, would soon be available. It was, he understood, the Mark IVa. It had been tested and was reasonably efficient, but he had heard of an even more comfortable one likely to be available, an American design, which could be worn for hours without any discomfort. Personally, he would not like to wear the Mark III or IV respirator hours on end in the ordinary foundry atmosphere-temperature conditions.

With regard to the comments on the use of mould paints, he was convinced from investigations they had made that one quite important source of the fine silica dust one found in foundries was the use of silica paint. That was a thing they had to endeavour to eliminate from foundry practice. He would ask the Authors if they had found any difficulties with zircon paints and with other alternatives to silica which were available. Some foundries were getting extremely good results with zircon paint while others were not getting such good results. He would like to know why. From his own examination of the cases where unfavourable results had been reported there had been two factors at work. First the zircon had not been quite as fine as desirable, and secondly the suspensory material had not been quite efficient enough. With zircon paint it was essential that the zircon should be real flour and that the suspensory medium used should be adequate to get a good suspension for painting or spraying purposes.

Steel Paints

The other materials which had been used with a certain amount of success in both steel and iron-foundries were paints based on nolochite (hard calcined china clays) and paints based on sillimanite or calcined or fused alumina. These materials contained no free silica and from the health point of view were good materials to use. He could, from his own observations in foundries, say that they gave good, satisfactory results as an alternative to silica flour. Much work was being done at the present time under the auspices of B.I.S.R.A. and the Dust in Steelfoundries' Committee on the examination of foundry atmospheres. Two or three Papers had been published for circulation through the Committee.

Work of the type envisaged in the Paper was work in the right direction. They had to do something from the point of view of foundry amenities, from the health point of view, and simply as good house-keeping.

MR. G. L. HARBACH said he had experimented with urea resins but the fishy fume in the foundry proved very objectionable. He had gone round Mr. Sheehan's foundry, where most of the cores were U.F. resin bonded, and was surprised to find that the atmosphere was so much milder than he had expected. He was aware that many experiments had been carried out before going into production on the scale he had witnessed, and he would like to know if it had been found that different U.F. resins had differed only in the amount of objectionable fumes produced. He wondered if in his own experiments he may have used the ordinary quality of U.F. resin used for making bonded plywood, whereas in Mr. Sheehan's case they were using a resin made primarily for foundry use?

Character of Fumes

DR. REES said the question of fumes was another example of the need for co-ordination in the work that was being done. There was a quite extensive piece of research going on to determine the actual character of the fumes evolved from any type of core bond, and that might answer some of the questions which had been asked. They had to be careful. There were possibilities of quite nasty fumes from both types of resin. He was interested not only from the point of view of the smell, but in other directions as well.

MR. SANDERS said it was important to remember the amount of fume that came from the dextrine which was often used. Linseed oil made considerable fume and it rather tended to blanket the fumes that came from the dextrine. It was urgently necessary to find a substitute for that as well as the resin or linseed oil. They did need something to give them green bond equal to the linseed or dextrine products.

Dermatitis

MR. HANDLEY said much had been said about fumes from the phenol resin, but he had been told that the trouble with phenol formaldehyde was the danger of dermatitis. It had been suggested that urea formaldehyde was much more free from that defect.

MR. KAIN said as far as they knew phenol formaldehyde was more or less free of the charge of causing skin trouble; that was always associated with urea and for that reason they were inclined to go off urea compounds. They had 40 operators working with phenol-bonded sand and so far there had not been one case of skin trouble.

MR. HARBACH said he had understood from remarks at a recent meeting that the phenol resins were more responsible for dermatitis than the urea resins. In one case of dermatitis, following the use of both resins, the patient had been told by his doctor that it was not due to the urea formaldehyde. They had carried out many experiments and, while they did not like the urea resins from the fume aspect, the opinion at the moment, as regards dermatitis, seemed to be that U.F. resins were safer than P.F. resins, but there was no definite information available.

(*Continued on page* 527.)

I.B.F. Conference Discussion

Production of Metallurgical Coke*

Anxiety About Future Supplies

By M. D. Edington

Uniformity Required

MR. L. W. BOLTON, opening the discussion, said he was pleased that Mr. Edington had agreed to present his Paper on coke at the present time, and no doubt the Author was aware that foundrymen had been having some trouble with the quality of cupola coke during the past few years. There were one or two points in the Paper which were not quite clear.

Mr. Edington had spoken of the necessity for working narrow seams of coal and the effect of this in increasing the ash content of the resulting coke. Were they to understand that in the past they had been skimming the cream of the coking coal in this country, and that in the future only seams of poorer-quality coal would be available? In other words, he would like to know whether the good old days were gone and whether they had to face a future when coke would not be of first quality? In the past foundrymen had very good coke in this country, and one of the difficulties to-day was that when a complaint was made about coke, we were asked "What were the properties you admired so much in the past?" Much work had been done to determine the desirable properties of cupola coke, but this was still a most difficult question to answer. One point on which there was general agreement was that a high shatter index was a very valuable feature in cupola coke. Reference was made in Table VII to four cokes which were stated to be "of excellent quality," yet coke "D" had a shatter index, on 2 in., of only 84. Before the war, no one would have agreed that a coke with a shatter of 84 was a coke of excellent quality.

Another point he would like clarified was whether the general deterioration in the quality of coke was due to the coal used. Was it due to lack of care and the use of mechanical equipment which gave a higher ash in the coal and therefore in the coke, or was it due to some change in the method of manufacture? For example, he noticed that coke "D" had short coking time and also a low shatter index and small lump size. Was the small lump size due to the use of a narrow oven or was it also due to the short coking time? A final point he wished to make, because he felt it was not sufficiently emphasised to the Coal Board and the coke producers, was that good-quality coke, with properties equal to the best produced before the war, could cause trouble in a foundry, especially in the production of high-duty iron, if it was delivered when the practice had been adjusted to suit coke of a poorer quality.

Uniformity of quality was perhaps the most important factor of all if ironfounders were to produce satisfactory castings regularly. Could Mr. Edington tell them if there was any possibility of getting more uniform coke or whether this aspect was receiving attention? He thought the Paper a most useful contribution to their knowledge, and if Mr. Edington would contribute still further, he would like to know the name of the suppliers of coke from plant "A" which produced the coke about which there had never been a complaint!

MR. EDINGTON thought he should make it clear that at plant "D" the size of the coke and the lower shatter index was due to the temperature of carbonisation and the width of the oven. He knew the plant personally and could vouch for the fact that the preparation and carbonisation of coal was most carefully done.

Concerning the best seams of coal there was no question but that they had gone; but that did not necessarily mean that the seams remaining were poor in coking qualities. They had coal coming into the plant at the present time which was quite one third shale, but when washed and suitably prepared it was equal in quality to the coal they had had in the past. He did not think foundrymen need have any worry as to the coking properties of the coal being used. It was more a question of extracting it at an economic price—which was out of his hands altogether—and also a question of having sufficient washing-plant capacity. At one plant where they were carbonising six thousand tons a week, two years ago half of the coal was taken straight from the pits and put into the ovens without washing, as it had less than five per cent. ash, but, now, the whole of it had to be washed. He thought the Coal Board were moving forward as at the five coking plants making foundry coke in Durham, each had a washery, and the washeries were now under the supervision of the coke-oven managers. Quite recently, the Coal Board had asked coke-oven managers to go to the pits and select the coal for coking, which was a further step in the right direction. There were, of course, a lot of marginal coals about, rather poor in coking qualities, which the coke-oven managers were steadfastly refusing to accept. He wanted it to be realised that they were fighting the foundryman's battle just as much as their own and that they were doing everything possible to see that the right quality of coal was getting to the coke ovens.

*Paper presented at the Cheltenham Conference of the Institute of British Foundrymen and printed in the JOURNAL August 4, 1949.

Production of Coke—Discussion

MR. FLEMING said Mr. Edington had just excused himself, quite rightly, as not being responsible for certain things which were attributed to people higher up in the scale than himself, when he referred to the economics of coke production. He, Mr. Fleming, thought that the powers that be, who decided the policy of coke ovens producing foundry coke should realise that the economics of foundry coke did not stop at their selling prices. The quality of coke could have a very appreciable effect on the costs of the foundry using that coke. It was a simple calculation, which any foundryman could make, to compare the cost of an increase of ten per cent. on coke as against an increase of one per cent. of scrap castings produced. If a high-quality casting were being made, the founder would soon be convinced that it was a bad policy to produce poor but cheap coke from the ovens. He felt strongly that foundry coke should be produced up to a standard and not down to a price. He thought foundrymen had learned that, apart from the shatter index and sufficient strength to resist the burden and shock in charging, the question of size was of paramount importance. A reduction in size below certain optimum levels did result in a loss of efficiency in combustion. It was as if the effective reactivity of the coke was altered. Worse than that, small mixed sizes were a positive damnation to the foundryman.

Much fundamental research into the mechanism of coke combustion in cupolas has already been carried out and he would like to refer the "powers that be" to the work of Jungbluth and Korchan, Buzek and Czyzeroski, the B.C.I.R.A., etc., and he would gladly supply a brief bibliography if so requested. Could foundries all be supplied with coke from ovens most suited to the production of high-quality foundry coke leaving coke from other ovens for less arduous duties?

MR. EDINGTON said the economics of foundry coke production went right back to the mining of the coal itself and he very much doubted, with the exception of one or two special districts, whether Durham coking coal was being mined anywhere economically. The losses were terrific on the mining of those particular coals which were essential to give a high shatter index. In other words, the small profit made on the coking operations was quite insufficient for the mining of that coal, but they were still hoping that there would be sufficient coal available for foundry-coke production. The "powers that be" held that if they had to mine coal specially and coke it in special ovens then the consumer should pay for it.

With regard to the size of the coke, the factors affecting that were the quality of the coal to start with and the size of the oven, and so on. Now that the older plants were being put in order and the screening arrangements had been greatly improved, supply should be better. Taking two of the largest coking plants in Durham which were between them responsible for 40 per cent. of the foundry coke produced in this country, there had been spent, in recent years, well over half a million pounds in improving the plant; rebuilding the ovens, providing new washeries, and so on. In time, the spending of those appreciable sums of money (and they were not the last, there would be more), would combine to improve the coke that founders were receiving. Perhaps he was biased, but there was a definite improvement noticeable over the past month or two compared with a year ago; the coke had a lower ash and was much better looking and of better size.

Relation between Quality and Price

MR. TOMLINSON pointed out that in his Paper, Mr. Edington had said that the foundryman faced the alternative of higher prices or inferior quality, but from his subsequent remarks it seemed that foundrymen had to face both higher prices and inferior quality, in spite of the money spent in providing new plant for coke ovens. Was there no policy of experimentation or research into the manufacture of coke which would improve quality and restore them to the pre-war conditions? If not, would it not be better to return to the bee-hive oven and so give this pre-war quality? In spite of the improvements which were said to be made, they were being pressed by the engineer for better castings. He thought it was up to the Coal Board people to get down to it and provide the coke for them, as after all they were the customers and should set the standard for the quality.

MR. EDINGTON interrupted to say he thought it could be as much a question of the quality of the coal coming to the ovens as the process of coking.

MR. TOMLINSON said he had understood Mr. Edington to say the quality of the coke was controlled by the coke-oven manager.

Continuing, MR. EDINGTON said the coking quality of the coal was a primary factor in the production of a suitable foundry coke. Marginal coals were available which could be washed to the same ash content as grade-one coal, but the coking properties were not good enough. Such coals were quite satisfactory for the manufacture of furnace coke, but coke-oven managers would try to prevent that type of coal being mixed in with that used for foundry coke.

A MEMBER said it appeared to him that the coke-oven managers, in their sticking-out for the better-quality fuel, were on the right lines. Speaking with some experience as a member of a firm making combustion appliances, the principles of which depended on coking coal, they had found to-day that there just was not sufficient coking coal available—a finding also reported in the production of foundry coke. His company were having to advise and to design for lower-grade fuels with basic principles far different from the coking coals for which the appliances were originally designed.

MR. EDINGTON said he understood that there was now a close liaison between the iron and steel industry and the Coal Board and he, personally, felt that that was beginning to have some effect.

MR. HUGHES thought most foundrymen in the past had been inclined to blame the raw coal for the poor quality of their coke, but the results of Table VII to him showed that the coke-oven manager was just as much to blame. They had a coke oven that had been running for 60 or 70 years and which was still producing good coke, of which any foundryman could have no reason to complain. Another, running at the same time, plant "D," quite possibly on the same coal or from the same area, was producing what most of them would be inclined to agree would be inferior coke. It was, therefore, no question of raw material, but purely and simply a problem for the coke-oven manager to consider in relation to the type of plant in use.

MR. EDINGTON thought if the foundry trade could prove conclusively that coke produced in the 20-in. oven at comparatively low temperatures, like cokes "A" or "B," was necessary, they might eventually persuade the Coal Board to put in that type of plant. The tendency at present was not to continue to build wide ovens operating at these low temperatures. His own experience of Durham coal was that it was necessary to carbonise gently and, if necessary, in as wide an oven as possible to make the best of the coking qualities of a coal. The type of coke produced in plant "D" (and he spoke as a coke-oven manager and was expressing his own opinion), was a retrograde step as far as quality was concerned.

MR. HUGHES asked why should foundrymen have to make the Coal Board realise that they were producing inferior coke? That realisation surely rested with them?

MR. EDINGTON said that, at the present time, a large proportion of the foundry coke was still being produced in the wider oven, but there would be a tendency, rather more than a tendency, to gradually switch over, during the next few years, to the narrow oven and a quicker coking time.

MR. V. C. FAULKNER said they had seen the economics of coke production and they congratulated Mr. Edington because he seemed to have co-operated very honestly with the Coal Board so far, but it was obvious to them that Mr. Edington had not co-operated with his customers, and they were good customers to the coke trade. He thought they should have been taken more into his confidence. To tell them they had got to revolutionise their practice to utilise a smaller size of coke was all wrong, and he protested that they were asking the foundry industry to utilise an inferior grade of coke. If they got a high percentage of wasters due to the inferior grade of coke the loss to the country would be very great, much greater than paying more money for the type of coke which was really required.

Coke Size

A MEMBER said the question of uniformity of size had been raised, and it was a very important matter. He understood that, in the new scheme for coke ovens, Mr. Edington had stated there was a tendency to use narrower ovens, which really meant that foundrymen were to receive smaller coke, or an increased proportion of smaller coke. Some of them were using very large cupolas and they knew from experience that a coke size of ten inches was the most efficient. If it were proposed to cut down to the narrow oven, and one could take it that roughly the size of the coke was a half that of the oven, then the coke produced would be very much below the size the foundrymen required. Before the Coal Board, or whoever was responsible for designing that new plant (which to-day cost a lot of money—three times pre-war costs), he thought that the industry should be consulted with regard to the coke size. It seemed to him that by catering, originally, for the large size, which was perhaps a small proportion of the total foundry consumption, then by adequate screening, they could get rid of the whole of the coke produced by grading it according to the size of the cupola in use.

Another point on which it appeared to him they were suffering a major deterioration in their coke was with regard to its ash, and sulphur content. All had heard of the wonderful records of output in American mines, but he postulated that the proportion of coal was much lower, despite a large bulk that was going to the coke oven. It appeared to him that the washing facilities for coke making were totally inadequate. He had noted that Mr. Edington had said that they were to have more facilities for washing under the new schemes. That he regarded as very important, for he thought it would have some effect on the sulphur content. He was not a metallurgist or a chemist, but he understood that sulphur existed in about three different forms and quite a large proportion of it could be washed away; so that adequate washing plant would not only relieve them of high-ash content, but it would also remove that large part of the sulphur which existed in the form which could be eliminated physically.

A further factor, which he wished to mention and which seemed to him to be more or less easy to control from a coke-oven point of view, was moisture. Quite apart from any difficulties there might be in the matter of working narrow seams of suitable coal high in moisture content, surely with the final coke it was a matter of quenching? Bearing in mind the price of coke, foundrymen were paying 6d. a gallon for water!

Coal Board to be Informed

MR. EDINGTON was pleased with the way the discussion had gone and said it would be reported back to the Coal Board. He had tried to obtain a figure for actual orders already placed for coal-washing plant, but he was unable to give any details. Twenty-three new washeries had been started-up during 1948 and a number of others had been brought up-to-date during the same period. Modernisation of others was held up by planning. With regard to moisture, it was felt that as far as the standard brands of foundry coke were concerned, there could be little cause for complaint. The question of the reduction of

(*Continued on page* 526.)

Institute Elects New Members

At a meeting of the Council of the Institute of British Foundrymen held at the Waldorf Hotel, Aldwych, London, W.C.2, on October 15, the following were elected to the various grades of membership:—

FIRST LIST

As Subscribing Firm Member

Kelly & Lewis, Limited, Springvale, Victoria, Australia (representative, Brian F. Russell).

As members

J. L. Allen, accountant-secretary, Bradley & Foster, Limited, Darlaston; A. A. Armstrong, production manager, H. Livesey & Company, Limited, Blackburn; J. L. Auld, foundry metallurgist, Alloy Steels (N.Z.), Limited, New Zealand; K. H. Brown, foundry manager, Brookfield Foundry & Engineering Company, Stoke-on-Trent; R. T. Hall, director and manager, H. Robinson (Ironfounders), Limited, Stourbridge; *A. Marson, chargehand, Appleby-Frodingham Steel Company, Scunthorpe; J. O. Milnes, foundry manager, Primrose & Company, Limited, Leith; G. R. Morton, lecturer in metallurgy and engineering, Corby Technical College, Corby; L. S. Petch, director, Marco Conveyor & Engineering Company, Limited, Leytonstone; A. Preece, M.Sc., professor of metallurgy, Kings College, Newcastle-on-Tyne; C. M. B. Rao, M.Sc., departmental head, heat-treatment and foundry sections, Hindustan Aircraft, Limited, Bangalore, India; T. Reynolds, foundry owner and manager, Tom Reynolds & Son, Wellingborough; Brian F. Russell, chief metallurgist, Kelly & Lewis, Limited, Victoria, Australia; F. C. South, managing director, S. H. Johnson & Company, Limited, London, E.15; *H. Stone, general manager, John Hall & Son (Oldham), Limited, Oldham; R. C. Taylor, chief metallurgist and chemist, T. J. Priestman, Limited, Birmingham, 12.

As Associate Members

B. S. Bartlett, foundry foreman, Bristol Foundry Company, Bristol, 1; W. P. Brown, ironmoulder, Dorrator Iron Company, Limited, Camelon, Falkirk; A. D. Busby, research metallurgist, The Mond Nickel Company, Limited, Birmingham; R. Carswell, assistant foreman moulder, Mavor & Coulson, Limited, Bridgeton; G. F. Cole, supervisor, Westinghouse Brake & Signal Company, Limited, Chippenham; M. Haggerty, foreman moulder, Argus Foundry, Limited, Glasgow; P. Hoesli, metallurgist, Light Production Company, Limited, Slough; S. H. Jackson, progress and foundry job planner, Castings, Limited, Walsall; H. G. Keatley, chief patternmaker, Castings, Limited, Walsall; R. J. Lilley, foundry foreman, Lupton & Place, Limited, Burnley; F. Mackin, foundry foreman, Castings, Limited, Walsall; J. S. McMillan, general moulder, David Brown-Jackson, Limited, Salford, 5; K. K. Mukherjee, chief draughtsman, Indian Iron & Steel Company, Limited, Bengal, India; H. Phillips, moulder, British Railways, Openshaw; H. Redfern, foundry manager, John Ruscoe & Company, Limited, Hyde; E. H. Roden, foundry foreman, Tweedale & Smalley (1920), Limited, Rochdale; A. Rothwell, foreman patternmaker, Tweedale & Smalley (1920), Limited; A. Searby, research metallurgist, British Iron & Steel Research Association, Sheffield; S. Sengupta, B.Sc., senior control assistant, Indian Iron & Steel Company, Limited, Bengal, India; T. S. Thompson, general moulder, David Brown-Jackson, Limited, Salford; G. Tomlinson, core-department supervisor, Henry Wallwork & Company, Limited, Manchester; W. G. Tonks, works trainee, W. & T. Avery, Limited, Birmingham; S. B. Ward, engineer, W. H. Smith & Company (Whitchurch), Limited, Whitchurch, Shropshire; J. Warren, jobbing moulder, Holland Foundry, Stockwell; D. N. Werapermall, assistant mechanical supervisor, Ceylon Government, Colombo, Ceylon; T. E. Wesson, foundry foreman, Messenger & Company, Limited, Loughborough.

As Associates (over 21)

H. W. Bonser, technical representative, Bradley & Foster, Limited, Darlaston; K. E. Burton, assistant works chemist Ley's Malleable Castings Company, Limited, Derby; P. G. Chapman, metallurgist, Conrad Parlanti Castings, Herne Bay; A. S. Fraser, apprentice metallurgist, Glenfield & Kennedy, Limited, Kilmarnock; D. Lewis, metallurgical chemist, Beans Industries, Tipton; R. W. Medley, assistant metallurgist, Gresham & Craven, Limited, Salford; A. H. Pendleton, laboratory assistant, British Piston Ring Company, Limited, Coventry; W. D. Stewart, foundry trainee, The Bo'ness Iron Company, Limited, Bo'ness; R. Walton, foundry patternmaker, Consett Iron Company, Limited, Consett.

As Associates (under 21)

F. E. Brookhouse, apprentice ironmoulder, Vulcan Foundry Company, Limited, Newton-le-Willows; A. K. Ghosal, "A" class foundry apprentice, Indian Iron & Steel Company, Limited, Kulti, West Bengal, India; I. R. Greene, laboratory assistant, Ley's Malleable Castings Company, Limited, Derby; R. Johns, metallurgist, Castings, Limited, Walsall; J. T. Mitchell, laboratory assistant, Ley's Malleable Castings Company, Limited, Derby; T. G. McLaren, ironfounder (trainee), Thos. McLaren & Sons, Limited, Galashiels; L. Robson, patternmaker's apprentice, Consett Iron Company, Limited, Consett.

(To be continued)

* Transferred.

"Atomic Physics"

This is an educational film which will no doubt be seen later on the London provincial circuits. It is divided into five sections and in a logical and fascinating manner takes the subject from Dr. Dalton's discovery of the atom, through the periodic table, to Lord Rutherford's monumental work on ions, electrons and neutrons. Continuing the progress in the splitting of the atom, the discovery of isotopes right through to the chain reactions and the production of the bomb. Finally, there is an appeal for the direction of atomic physics towards industrial and medical developments and the establishment of universal peace.

Institute of British Foundrymen — *Birmingham Branch*

Balance within the Industry

Mr. H. G. Hall's Presidential Address

At the opening meeting of the Birmingham, Coventry and West Midlands Branch of the Institute of British Foundrymen, Mr. H. G. Hall, F.I.M., delivered his Presidential Address, in the course of which he said:—The Chinese are considered to be the oldest of founders. Their writings savour of the philosophical and to me, have always combined wisdom with charm. Here, perchance I might find my theme. Imbibing deeply of matters Chinese, I found much about the Yin and the Yang, but little about the ancient craft of founding. The Yin and the Yang may be translated in a variety of ways:—"Positive and negative," "black and white," "cause and effect." In short, both sides of the picture or the art of balance. Here seemed to be a suitable theme and I therefore propose to-night to examine certain aspects of balance within our industry.

I have been unable to obtain data covering the industry as a whole, but the ironfounding section alone comprises over 2,000 foundries, employs some one hundred and fifty thousand people and, in 1948, produced over 3¼ million tons of castings. Therefore, it is easily seen that, taking into consideration the by-no-means negligible non-ferrous contribution, the combined annual turnover must total many hundreds of millions of pounds. I would ask you to visualise these facts as the "Yin"; let us now proceed to the "Yang."

Flourishing and progressive are terms often applied to our industry, yet when a group of foundrymen get together, a common topic is the difficulty of obtaining skilled craftsmen, competent foremen and executives possessing technical knowledge, "know-how" and the ability to handle men.

National Foundry College

Recently, it was stated that the old British Foundry School trained some thirty-seven students between 1935 and 1939. The new National Foundry College enrolled eighteen students in each of the first two sessions and for the current session the number approaches thirty, of whom twenty-five per cent. are from overseas. Of those remaining, only fifty per cent. are sponsored by their employers. As a member of the audience, I received these facts with a sense of profound disquiet, because the implication is clear—only one dozen firms out of the entire industry are supporting this college. The time is passing when self-trained men can successfully operate foundries and in future the industry will have to rely on technically-trained personnel.

The National Foundry College training is designed to produce the technical executive of the future and I suggest that an industry of our magnitude could easily sustain an annual entry of one hundred students to that institution. The conditions of entry will be familiar to all; they provide for an initial standard of knowledge, which should guarantee that every entrant will profit from the instruction available and become an asset to his employer. Yet, in spite of this, we have the meagre supported quoted above, which does not even offset the annual wastage due to death and retirement. Finally, in this connection it is pertinent to note that the French founding industry is training technicians on a very much larger scale than ourselves.

To approach the question of the technical instruction or the training of our foundry craftsmen, this should include foremen, a body of men so aptly described by the national President, Mr. N. P. Newman, as the backbone of our industry. Logically, one might expect the "City and Guilds" courses, provided at various technical colleges, to meet the need. It is a fact that many firms send boys to such courses and also that the possession of a City and Guilds full technological certificate in Foundry Practice or Patternmaking is adequate qualification for an Associate Member for admission to our own Institute.

Apprentice Training

The industry as a whole has recently decided to establish the National Foundry Craft Training Centre at West Bromwich. I must confess that I am not personally familiar with the early events leading to the setting-up of this centre but, as far as I can ascertain, no approach was made by the industry as a body, to any of the local education authorities, with a view to using the existing well-equipped technical-college foundries for such a purpose. Be that as it may, the fact remains that the setting-up of the West Bromwich Training Centre is a praiseworthy effort and deserving of far more support than it receives at present. From a notice in the current issue of our Journal it is disheartening to find that there are still vacancies at this centre for the next two or three terms.

Research

The following bodies are engaged in research, namely, the British Iron and Steel Research Association, the British Cast Iron Research Association, the British Non-Ferrous Metals Research Association, the Department of Scientific and Industrial Research, the laboratories of universities, technical colleges, etc., and last, but by no means least, the various technical committees of the Institute. I have no hesitation in stating that in the field of fundamental research, we, in this country, are second to none, and I have not in that comparison overlooked the United States with its immense resources. On the other hand, I am not entirely satisfied that we can claim the same superiority in the practical

Mr. H. G. Hall's Presidential Address

utilisation of fundamental research. In fact, I suggest that in this respect we are definitely lacking in comparison with the United States.

I am sometimes asked the question, "What do we get out of our research associations?" My reply is that we get precisely what we ask for. My interrogators fail to realise that a question worthy of an answer must be properly defined. For instance, many well-meaning industrialists have, in the past, subscribed large sums of money to research organisations without stipulating specific problems to be solved. In return, they have received lengthy technical reports of a very high standard, which, I dare to say, they have scarcely taken the trouble to read.

It should be recognised that, while the prime function of a research association is to conduct research, it is not a *prima facie* necessity that it should also initiate the research. Such a body is perhaps in the strongest position to originate fundamental research, but it is up to the practical man to maintain a balanced research organisation by providing industrial problems for solution. In the case of the B.C.I.R.A. the opportunity for presenting such problems is through the medium of the various technical committees of the Association. The recent introduction of the pig-iron levy has afforded an opportunity for many more firms than hitherto to participate in the activities of this Association.

The technical committees have, therefore, been reconstituted in order that the influx of new members might have adequate representation. Members of these committees should realise that they have a very real responsibility to the section of industry which they have the honour to represent. Their function is to define the problems of industry, to formulate a programme of research designed to solve those problems and also constructively to criticise the work of the investigators. They, and not necessarily the latter, should be judged by the reports emanating from their committee. Moreover, these members are actively engaged in industry and should therefore be in an ideal position to persuade management to put into practice the results of the research. These results, I fear, are too often pigeonholed and forgotten.

The technical committees of the I.B.F. have been in existence for a number of years and have made substantial contributions to the welfare of the industry. Whether one should consider these committees as engaged in research is a moot point—as Joad might say—it depends what you mean by research. Personally, I feel that the term research should be largely restricted to fundamental work and that the majority of the problems which are dealt with so adequately by these committees, would be better termed technological investigations. In this particular field, the work of these technical committees is worthy of the highest praise.

Comparing the manner in which the technical committees of the B.C.I.R.A. and the I.B.F. operate, a

(*Continued at foot of next column.*)

Production of Metallurgical Coke

(*Discussion continued from page* 523.)

sulphur by washing was not important in Durham as washing made very little difference to the sulphur in Durham cokes.

Regarding the supply of very large coke, existing wide ovens, which had had money spent on them, could continue to produce half a million tons a year, or approximately half the production of foundry coke, so that the question of eliminating the wide oven and large-size coke altogether did not arise. It was a question of replacement plant for the other 500,000 tons. He understood that the South Western Board had indicated their intention of choosing the narrow oven, and that seemed to be the general policy. There was one thing in favour of the narrow oven, when the coke was screened over four inches, the size range should be fairly close.

MR. YOUNG pounted out that no-one had asked if coking coals and foundry cokes were following everything else in this country, *i.e.*, the best being exported.

MR. EDINGTON said the export of the best coking coals had definitely stopped, and foundry coke was not being exported either.

MR. F. C. E. SLEAP, of Cyprus, said that by the time the coke reached him he thought that a six-inch oven must be in use.

Another member thought some foundrymen ought to go into their own practice with regard to cupola coke. His company had found that with large-size coke used exclusively they got more oxidation and packing. They also found that the largest size of hard coke was not the best to use, and they arrived at the conclusion that the thing to do was to find a size of coke to suit their purpose. Secondly, he thought it was up to the foundry to specify and buy to specification. That had been done for years and, in the case of the Durham and Welsh cokes there had been no difficulty, apart from the usual war difficulties, in meeting their requirements. So he thought part of the remedy was in their own hands. They should insist that they got coke to the specification sent out.

(*Continued from previous column.*)

significant difference will be observed. The former must initiate the research and approve the work of their investigators, the latter are given a specific problem to solve and asked to find their own facilities for the purpose. It is my experience that this difference leads to one danger, namely, that members of the first-named may be lulled into becoming a reception committee, with much wise head nodding and little else. Service to industry is the link between the British Cast Iron Research Association and our Institute and it is worthy of note that in the newly-constituted committees of the former, many members of the I.B.F. take an active part. This increased co-operation is to our mutual advantage and would be further strengthened if the B.C.I.R.A. were represented on our technical committees.

Steel Production

Current and Future Supplies

In the first half of this year, according to an article on steel supplies in the September "Bulletin" of the British Iron and Steel Federation, the output of ingots and castings was at an annual rate of 15.9 million tons, compared with a figure of 15.1 million tons in January-June, 1948. A seasonal decline naturally occurred during July and August—though each month showed an improvement over 1948—but the actual output in the first 37 weeks of 1949 amounted to 11 million tons, or 5 per cent. above the corresponding total for last year. With the main holiday period now past, an early return to the record production levels of the second quarter is to be expected.

The 1949 rate of production is about twice as high as that achieved on the average in the 20 inter-war years, 1919-38, and, as the "Bulletin" points out, the continued advance in production is evidence of a sustained effort by managements and workpeople alike attributable in part to the gradual expansion of capacity.

The quantity of iron ore on hand is now well above the level of a year ago, and there has been a marked improvement in reserves of pig-iron and particularly in scrap. Such a stock build is desirable in view of the higher production rates envisaged for the future. Meanwhile, on the basis of the first eight months' performance, it is possible—assuming no unforeseen developments—to estimate 1949 steel-ingot production at a minimum of 15.5 million tons and supplies of re-usable material, etc., at 0.6 million.

Steel Imports and Exports

Steel imports in the first half-year were running at an annual rate of 1.2 million ingot tons and there was some increase in July and August. Over half of these arrivals consisted of Belgio-Luxemburg and U.S. material, the sterling prices of which have been raised by about 26 per cent. and 44 per cent. respectively as a result of the devaluation of the pound. It is too early to say yet whether imports from these hard-currency sources will have to be curtailed on account of their higher cost. But it is proposed for present purposes to leave the 1949 estimate of imports unchanged at 1.2 million tons, on the assumption that the slight excess of the first eight months will be offset during the last quarter.

Regarding direct exports, so far as these are concerned, the position is dominated by Government policy. Earlier this year, direct exports were estimated at 2.2 million ingot tons for the year as a whole, with the suggestion that some advance on this rate might be justified later. In fact, the annual rate for the first half-year was nearly 2.4 million tons and that for July as high as 2.8. Though devaluation is not expected to make much difference in this field, it seems realistic on the basis of the first eight months' figures to raise the 1949 estimate from 2.2 to 2.5 million tons.

Of greater quantitative importance is the "indirect" export of steel in the form of machinery, vehicles, tools, etc. During the first half-year, taken as a whole, exports of the steel-using industries were actually running ahead of their end-year target rates—a monthly average of £59.6 million for the four principal groups for the six months comparing with a target rate of £58.8 for the year-end. They thus represented a gradually increasing proportion of British exports as a whole and are estimated to have consumed steel at an annual rate of 3.1 million tons. But a general setback in British exports occurred during the second quarter, from which the steel-using industries were not immune.

Insofar as overseas buyers have been holding off in anticipation of the Chancellor's decision on devaluation, some immediate benefit should be reaped. If this is so, the steel-consuming industries—which, together with the steel industry itself, now provide 47 per cent. of total exports—may be expected to share in the improvement. In view, however, of the decline which occurred after the first quarter, it is considered improbable that exports of the steel-using industries during the whole 12 months will exceed the end-1949 target rate. It is proposed, therefore, to leave unchanged the original estimate of 3 million ingot tons for "indirect" steel exports, this being the best assessment that can be made of the quantity of steel required to meet the end-1949 export targets.

Qualcast's New Factory

Qualcast, Limited, Derby, has purchased the former Braid Engineering factory at Sunnyhill, Derby. It will be used as an extension to the Qualcast works in Victory Road. Braid Engineering is one of the subsidiaries of the Braid Group, whose chairman announced last June the board's decision to close down the Engineering Division, realising the assets to best advantage.

Work of the Lake and Elliot Foundry

(*Discussion continued from page* 520.)

Replying to these points, MR. SANDERS said that after the last meeting he had got in touch with several authorities on the question of dermatitis and they all assured him that urea was the one to be afraid of. Further than that he could not go, but he could definitely say that they had not experienced any trouble with phenol.

A formal vote of thanks was not passed, but the Chairman, when thanking Messrs. Sanders and Kain for the presentation of the Paper and the manner in which they had dealt with questions and the discussion, said he thought the meeting had shown how much it had appreciated what had been done by the interest they had clearly taken in the subject.

This concluded the discussion on the report dealing with the work of the Lake and Elliot Foundry Technical Committee.

Pig-iron and Steel Production in Great Britain

Summary of August Statistics

The following particulars of pig-iron and steel production in Great Britain have been extracted from the Statistical Bulletin for September, 1949, issued by the British Iron and Steel Federation. Table I gives the production of pig-iron and ferro-alloys in August, with the number of furnaces in blast; Table II, production of steel ingots and castings in August, and Table III, deliveries of finished steel. Table IV summarises steel-industry activities during the six months ended August.

TABLE I.—*Weekly Average Production of Pig-iron and Ferro-alloys during August*, 1949. (*Thousands of Tons.*)

District.	Furnaces in blast, 3.9.49.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derbyshire Leics., Notts., Northants, and Essex	26	—	14.0	24.0	1.6	—	39.6
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Cheshire .. Yorkshire (incl. Sheffield, excl. N.E. Coast) ..	6	—	6.4	—	—	1.5	7.9
Lincolnshire ..	15	—	25.7	—	—	—	25.7
North-East Coast	23	7.8	36.9	0.3	—	1.4	46.4
Scotland	9	0.8	11.7	2.9	—	—	15.4
Staffs., Shrops., Worcs., and Warwick ..	8	—	8.9	1.2	—	—	10.1
S. Wales and Monmouthshire	8	3.8	18.4	—	—	—	22.2
North-West Coast	7	12.8	—	0.2	—	2.0	15.0
Total ..	102	25.2	122.0	28.6	1.6	4.9	182.3
July, 1949 ..	101	26.4	115.2	30.5	1.3	4.0	177.4
August, 1948 ..	102	25.5	118.0	25.6	2.0	2.9	174.0

TABLE III.—*Weekly Average Deliveries of Non-alloy and Alloy Finished Steel.* (*Thousands of Tons.*)

Product.	1947 (53 weeks).	1948.	1948. August.	1949. July. (revised).	1949. August.*
Non-alloy Steel:—					
Heavy rails and sleepers	7.6	8.9	7.4	8.5	7.8
Heavy and medium plates	31.6	36.2	29.9	26.3	36.3
Other heavy products	31.8	34.7	29.0	30.8	31.9
Lightrolled products§	52.9	59.5	53.7	40.9	42.3
Hot-rolled strip ..				16.4	14.3
Cold-rolled strip ..	4.6	4.7	4.3	4.1	4.6
Bright steel bars ..	4.8	6.0	5.4	4.8	4.9
Sheets, coated and uncoated ..	24.3	26.3	21.6	23.6	23.5
Tin, terne and blackplate	12.1	13.5	10.4	12.0	11.0
Tubes, pipes and fittings	13.5	15.1	12.4	15.7	15.9
Wire	10.8	12.8	12.2	12.3	14.8
Tyres, wheels and axles	3.5	3.9	3.6	3.0	4.1
Forgings	5.0	6.0	5.1	5.3	5.9
Castings	3.0	3.5	3.3	2.9	2.9
Total	205.5	231.1	198.3	206.6	220.2
Alloy Steel†:—					
Tubes and pipes ..	0.3	0.4	0.2	0.3	0.5
Bars, sheets, strip and wire	3.7	4.7	4.0	3.7	3.9
Forgings	1.8	2.5	2.4	2.2	2.4
Castings	0.6	0.7	0.6	0.6	0.7
Total	6.4	8.3	7.2	6.8	7.5
Total U.K. production ‡	211.9	239.4	205.5	213.4	227.7
Less intra-industry conversion ..	19.2	29.0	26.3	26.9	29.5
Net U.K. deliveries	192.7	210.4	179.2	186.5	198.2
Add imported finished steel	2.2	3.4	2.8	11.5	7.1
Total deliveries of finished steel ..	194.9	213.8	182.0	198.0	205.3

† Excludes high-speed steel. ‡ Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.
§ Excl. wire rods and alloy-steel bars, but incl. ferro-concrete bars.

TABLE II.—*Weekly Average Production of Steel Ingots and Castings, August*, 1949. (*Thousands of Tons.*)

District.	Open hearth. Acid.	Open hearth. Basic.	Bessemer.	Electric.	All other.	Total. Ingots.	Total. Castings.	Total ingots and castings.
Derby, Leics., Notts., Northants and Essex ..	—	—	10.7(Basic)	1.4	0.2	11.7	0.6	12.3
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Cheshire .. Yorkshire (excl. N.E. Coast and Sheffield) ..	2.2	18.4	—	1.0	0.3	21.1	0.8	21.9
Lincolnshire	—	31.1	—	—	0.1	31.1	0.1	31.2
North-East Coast	1.4	58.2	—	0.8	0.4	59.3	1.5	60.8
Scotland	4.2	43.1	—	1.6	0.7	48.0	1.6	49.6
Staffs., Shrops., Worcs. and Warwick	—	13.0	—	0.7	0.4	13.1	1.0	14.1
S. Wales and Monmouthshire	7.9	38.4	4.7(Basic)	0.7	0.1	51.4	0.4	51.8
Sheffield (incl. small quantity in Manchester) ..	7.9	24.2	—	7.2	0.6	38.2	1.7	39.9
North-West Coast	0.4	2.4	2.8 (Acid)	0.3	0.1	5.9	0.1	6.0
Total	24.0	228.8	18.2	13.7	2.9	279.8	7.8	287.6
July, 1949	22.5	187.8	19.6	11.5	2.8	237.7	6.5	244.2
August, 1948	24.9	210.8	19.9	12.8	3.1	264.0	7.5	271.5

*Five weeks.

(*Continued at foot of following page.*)

Personal

MR. S. R. HOGG has resigned from the board of Specialloid, Limited, metallurgists, etc., of Friern Park, London, N.12.

MR. JOHN ORR, head foreman of the brass-finishing department of Glenfield & Kennedy, Limited, Kilmarnock, has retired after 51 years' service.

LORD KILLEARN OF KILLEARN has joined the board of Siemens Bros. & Company, Limited, electrical engineers and contractors, of Woolwich, London, S.E.18.

COL. W. R. GLOVER has been appointed chairman of Glover & Main, Limited, Grosvenor Gardens, London, S.W.1, in succession to the late Sir Ernest Hiley.

MR. EDMUND FARROW, a director of Douglass Bros., Limited, engineers and foundrymen, of Blaydon-on-Tyne, has retired. He had been with the firm for 44 years, starting as a clerk.

MR. N. A. W. LEGRAND assumed his appointment as secretary of the British Welding Research Association last week. The vacancy was caused by the resignation of MR. A. BARKER.

MR. EDWARD C. WOODALL has been appointed a director of Parkinson & Cowan, Limited, which holds the share capital of Parkinson & Cowan (Gas Meters), Limited, Parkinson Stove Company, Limited, and other companies.

MR. EDWIN WATKINSON has been appointed chief mechanical engineer to Newton, Chambers & Company, Limited, Thorncliffe, near Sheffield. He will be responsible to the managing director, Sir Harold West, for the mechanical-engineering activities of the company.

MR. FRANK HEWITT, joint managing director of George Turton, Platts & Company, Limited, manufacturers of drop forging and stampings, of Sheffield, has completed 50 years' service with the firm. He received a silver tobacco jar from the staff and management to mark the occasion.

MR. W. ADAM has been appointed to succeed the late Mr. J. Miller as manager of the Glasgow district office of the British Thomson-Houston Company, Limited. Mr. Adam was appointed to the Glasgow office as sales engineer in 1929 and became assistant manager in September of last year.

SIR RICHARD PEASE, BT., has resigned from the board of the Brush Electrical Engineering Company, Limited. The following three members of the staff of the company have been appointed directors:—MR. P. C. SHARP, secretary; MR. ANDREW H. SYME, comptroller, and MR. D. S. A. E. JESSOP, director of personnel.

MR. HUGH C. WATERSTON, vice-chairman of Bairds & Scottish Steel, Limited, was re-elected president, with MR. H. W. G. FERGUSON, managing director of Raine & Company, Limited, Newcastle-upon-Tyne, vice-president, at the annual meeting of the Wrought Iron Council of Great Britain held at North Berwick.

MR. R. W. VIGERS, who has recently joined the staff of W. H. Dorman & Company, Limited, manufacturers of Diesel engines, ironfounders, etc., of Stafford, has been appointed technical assistant to the managing director. LIEUT.-COMM. (E) C. F. I. COGGINS, who joined the company early this year and has recently completed a tour of Australasia, has been appointed sales engineer.

MR. IVAN LAMOUREUX, a founder of the *Association Technique de Fonderie de Belgique* 38 years ago, has been elected as president and Mr. Jacques Foulon as general secretary of that organisation. Mr. Réne Deprez and Mr. Edwin Commins, who have retired from these offices, will continue to be members of the Council. The address for correspondence will now be 195, rue Saint Léonard, Liège.

DR. I. G. SLATER, formerly Director of Operational Research at the Admiralty, has been appointed Director of Research and Development of the aluminium division of Tube Investments, Limited. Attached to the administrative and marketing organisation, he will be concerned with the research and development of the company's aluminium manufacturing subsidiaries, Reynolds Rolling Mills, Limited, Reynolds Light Alloys, Limited, and the South Wales Aluminium Company, Limited.

PIG-IRON AND STEEL PRODUCTION IN GREAT BRITAIN (*Continued from previous page*).

TABLE IV.—*General Summary of Pig-iron and Steel Production.* (*Weekly Average in Thousands of Tons.*)

Period.	Iron-ore output.	Imported ore consumed.	Coke receipts by blast-furnace owners.	Output of pig-iron and ferro-alloys.	Scrap used in steel-making.	Steel (incl. alloy).			
						Imports.†	Output of ingots and castings.	Deliveries of finished steel.	Stocks.‡
1938	228	89	—	130	118	16	200	—	—
1947 (53 weeks)	200	136	165	147	145	8	240	195	797
1948	252	172	200	178	174	8	286	214	1,028
1949—March*	263	158	198	179	199	20	313	242	1,031
April	255	163	198	179	192	20	305	226	1,097
May	263	171	201	187	199	22	316	245	1,121
June*	268	168	202	186	188	28	301	236	1,177
July	258	164	194	177	152	21	244	198	1,238
August*	248	172	196	182	179	21	288	205	1,317

* Five weeks. † Weekly average of calendar month. ‡ Stocks at end of years and months shown. § Provisional.

News in Brief

A MOBILE X-RAY UNIT is to tour Sunderland's shipyards to test for welding faults in ships under construction.

THE West Cumberland Industrial Development Company, Limited, is to build a factory for Ogden & Lawson, non-ferrous founders, etc., of Workington.

NEGOTIATIONS are to be opened on November 3 on the claim of the Iron and Steel Trades Confederation for a reduction in the working hours in the steel-melting shops from 48 to 42 per week.

H.M. CONSUL-GENERAL at Milan reports that there are believed to be good possibilities for introducing British foundry plant and equipment on the Italian market, particularly plant of sound construction incorporating new designs and applications.

ON COMPLETION OF 40 years' service with Ley's Malleable Castings Company, Limited, Derby, long-service certificates and monetary gifts were presented by Mr. Francis Ley, the managing director, to Mr. George Mellors (moulder), Mr. Frederick Kirkland (moulder), Mr. Arthur Fellows (casting inspector), Mr. Ernest J. Groves (Joiner), and Mr. Thomas Smithyman (trimmer).

" INDUSTRY IS SICK TO DEATH of being exhorted to do things it knows it is already doing," said Sir Robert Sinclair, president of the Federation of British Industries, in a recent address to members of the Southern Region of the F.B.I. at Reading. He said that the importance of reducing costs might be appreciated by employers, but it was not yet adequately appreciated by the workers. Devaluation, he hoped, would prove a "salutary shock" to the nation.

SPEAKING AT THE annual dinner of the Incorporation of Hammermen of Glasgow, on October 5, Mr. Victor Warren, Lord Provost, said that the building of ships was a highly-skilled process, and the running of them equally highly skilled, and he hoped that, as a great industry in Britain, shipbuilding would be left in the hands of private enterprise. If any of their friends in another place interfered with it, the results would be very much like those in other things to which they had put their hands, he said.

PRESIDING AT a meeting of the Institution of Electrical Engineers in London, on October 6, Dr. E. B. Moullin, professor of electrical engineering at Cambridge University, said that he would like to see the hundreds of young men training at universities as research students distributed through industry for their training. Should some of them return later for further training, they would bring with them a much better appreciation of the purpose and meaning of the problems they were setting out to solve.

SERIOUSLY EMBARRASSED by the lack of young entrants into the steel industry, the Cargo Fleet Iron Company, Limited, Middlesbrough, with the backing of the British Iron and Steel Federation, the trade unions, and the local education authority, has launched a recruiting campaign among the youth of the district. It is stated that the scarcity of youths is so pronounced that, despite the extra cost, adult labour has to be employed on jobs normally earmarked for youths, while a small army of young women is still engaged on mill work.

IN THE COURSE of an industrial tour of the West Riding, Sir Basil Brooke, Prime Minister of Northern Ireland, visited the Wellington foundry of Fairbairn Lawson Combe Barbour, Limited, Leeds, where he saw the latest types of textile machinery for the spinning of jute and flax, among them being a draft spinning frame for eight spindles which was built for and given to Belfast College of Technology for demonstration purposes. Sir Basil said he was particularly interested in the links with manufacture which Northern Ireland had with this country, especially in textile machinery and textiles.

A DRAFT DESIGNATION ORDER for the new town of Corby in Northamptonshire has been published by the Ministry of Town and Country Planning. The area comprised within the Order is some 3,550 acres, on which it is proposed eventually to build a town with a population of some 40,000. Corby at present has a population of some 14,000 and nearly 6,000 of these are employed by Stewarts and Lloyds, Limited. Further expansion of the company's works is expected to provide employment for 4,000 more, but already, owing to the shortage of houses, many of the workers have to travel a considerable distance every day. This is particularly inconvenient in view of the fact that the works operate on a continuous-shift basis.

IN A STATEMENT on wage pegging, delivered at the half-yearly meeting of the Cleveland district delegate board of the National Union of Blastfurnacemen, which was held at Redcar on Wednesday, Mr. J. Owen, the general secretary, said: "We are confident that our members will go on producing record outputs, but there must be no undue interference with the automatic operation of wage agreements or the freedom of collective bargaining." He claimed that the differential margins between the various grades and jobs in the industry were based on skill and responsibility and insisted that these must be preserved; otherwise, the incentive which attracted labour to qualify for the higher-paid production jobs would be destroyed.

BECKETT & ANDERSON, LIMITED, mechanical and electrical engineers, of Rutherglen, near Glasgow, went into voluntary liquidation as at September 30. The joint managing directors (Mr. Frank Beckett and Mr. R. C. Anderson) announce that a new company has been formed, under the same name, to carry on the business from that date. "We both feel," they state, "that the time has come for us to take things more easily. Accordingly we shall not be actively associated with the new company, but our colleague, Mr. W. G. Gibb (a director and secretary of the old company), will be a director and the technical staff and employees will be retained. The new company, which has been formed under the auspices of the Coltness Iron Company, Limited, will, therefore, have the advantage of the organisation of the business and there will be no interruption or inconvenience as regards current or future orders. Any orders at present outstanding will be accepted by the new company."

STANTON-DALE

REFINED PIG IRON

Designed to meet the demands of high quality castings, which are, strength, machineability, and resistance to wear.

All these can be secured by using Stanton-Dale Refined Pig Iron in your cupolas.

The above illustration shows a group of castings made by Messrs. Goodbrand & Co. Ltd., Stalybridge, Cheshire.

PROMPT DELIVERY

THE STANTON IRONWORKS COMPANY LIMITED NEAR NOTTINGHAM

Company News

The paragraphs below have been extracted from statements circulated to shareholders, speeches made at annual meetings, and other announcements.

Metal Traders, Limited, Gracechurch Street, London, E.C.3:—It is proposed to capitalise £374,184 of reserves by issuing free to stockholders nine new £1 shares for each £1 of stock held. (This will restore the ordinary capital of the company to the figure ruling before the 1940 capital repayment of 18s. in the £.) If the proposal is approved by the Capital Issues Committee and stockholders, the position, it is stated, will be roughly as follows:—Issued capital, £415,760; general reserve, £100,816; and carry forward, £133,870. In connection with the bonus, the directors point out that the investment in Metal Traders, Inc., has remained unchanged in the parent company's balance-sheet at £50,000, although the paid-up capital of the New York company was raised from $250,000 to $500,000 in 1948. They have, therefore, decided to correct what is an "anomalous capital structure" by writing up the New York investment to £125,000, placing the difference to general reserve and issuing the bonus shares.

Horseley Bridge & Thomas Piggott, Limited, Tipton (LORD DUDLEY):—The new foundry, which marked the virtual completion of all the major stages of the works reconstruction scheme, went into production in December, 1948. Very little remains to be done on the main reconstruction scheme, but we are improving the internal railway and road systems to facilitate the movement of raw materials and fabricated products within the works, in order to improve output and reduce production costs. Our order-book is very full and we will continue to produce to the limit of the skilled labour and materials available to us.

Company Results

(Figures for previous year in brackets.)

THOS. W. WARD—Final dividend of 10%, making 15% (same).

LAKE & ELLIOT—Final dividend of 10% (15%), making 20% (same).

SETTLE LIMES—Trading profit for the year ended July 31, £89,880 (£69,180 previous year, including £610 income tax recovered); to depreciation, £26,000 (£23,000); directors' remuneration, £7,216 (£6,133); auditors' fees, £385 (£380); taxation, £33,250 (£21,400); profit, £23,029 (£18,267); dividend of 9% (6%); to general reserve, £14,000 (£9,000); forward, £9,872 (£9,887).

HORSELEY BRIDGE & THOMAS PIGGOTT—Balance of trading account to June 30, £146,690 (£147,774); income of previous years on settlement war contracts—after £13,900 taxation—£77 (£1,192); investments income, £6 (£556); to depreciation, £24,261 (£21,968); directors' remuneration, £8,675 (£12,102); income tax, £37,500 (£40,100); profits tax, £17,000 (£22,000); leaving £59,337 (£53,352); dividend of 15% (same); general reserve, £45,000 (£30,000); forward, £86,041 (£98,104).

S.G.B. (DUDLEY)—Trading profit and miscellaneous income for the year ended June 30, £26,360 (£9,853); to directors' fees, £900 (same); managing directors' salaries, £3,042 (£3,500); audit, £336 (£225); staff pension, £1,296 (£1,216); depreciation of vehicles, £462 (£538); depreciation and renewals, £1,500 (same); profits tax, £3,100 (nil); income tax, £7,100 (nil); net profit, £8,624. (To net profit of £1,974 for 1947-48 was added £5,050 from dividend equalisation reserve.) Preference dividend, £4,950 (same); forward, £13,034 (£9,360).

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference E.P.D. or C.R.E. can be obtained from the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, London, S.W.1.

AUSTRALIA, November 15—Sand-drying plant, for the State Electricity Commission of Victoria. The Agent-General for Victoria, Victoria House, Melbourne Place, Strand, London, W.C.2.

MARLBOROUGH AND RAMSBURY, November 26—Provision and laying of about 25 miles of spun-iron pipes, 3-in. to 7-in. dia., etc., for the Rural District Council. John Taylor & Sons, engineers, Artillery House, Artillery Row, Westminster, London, S.W.1. (Fee £5, returnable.)

WALSINGHAM, NORFOLK, November 14—Provision and laying about 1½ miles of 3-in. and 4-in. cast-iron pipe mains, etc., for the Rural District Council. The Council Offices, Fakenham. (Deposit, £2 2s.)

Obituary

MR. ALBERT SMITH, whose death occurred on October 4, was formerly managing director of Qualter & Smith Bros., Limited, colliery engineers and foundrymen, of Barnsley. He was 87.

MR. PERCY VICTOR ASPREY, who died suddenly on October 12, was technical manager of the chemical plant of Cannon Iron Foundries, Limited, Bilston, Staffs. He had been associated with the company for 38 years.

MR. HARRY EDWARDS, who died recently, was formerly for many years works manager of William Hunt & Sons, The Brades, Limited, steel and edge-tool manufacturers, of Oldbury. He was also a director of the subsidiary company, Bache Bros., Limited.

Wills

MORTIMER, J. P., a director of Warner & Company, Limited, pig-iron manufacturers, of Middlesbrough £29,260

PERRY, R. G., High Sheriff of Warwickshire in 1947, and a former director of the Imperial Smelting Corporation, Limited £189,595

HYLAND, WILLIE, representative of Sanderson Bros. & Newbould, Limited, steel manufacturers, of Sheffield, for 46 years £3,681

WILSON, F. P., formerly associated for 20 years with Pease & Partners, Limited, pig-iron manufacturers, of Darlington £6,670

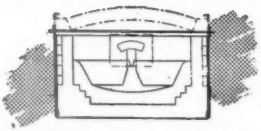
CHEW, B. P., late chief engineer of the Wolverhampton Steel & Iron Company, Limited, and a director of Teague & Chew, Limited, ironfounders, engineers, etc., of Cinderford (of which his father was a founder) £1,862

TOWERS, HARRY, managing director of A. Reyrolle & Company, Limited, manufacturing electrical engineers, etc., of Hebburn, Co. Durham, a director of the Bushing Company, Limited, manufacturers of insulating materials, of Hebburn, the Heaton Foundry Company, Limited, Newcastle-upon-Tyne, and other companies ... £32,048

DAY, CHARLES, chairman of Mirrlees (Engineers), Limited, and vice-chairman of John Hall & Son (Oldham), Limited, ironfounders, and the Mirrlees Watson Company, Limited, engineers and ironfounders, of Glasgow; a past-president of the Institution of Mechanical Engineers, the Whitworth Society, and the Manchester Association of Engineers £69,834

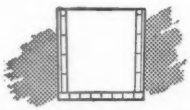
BRITAINS BEST BASIC REFRACTORIES

G·R '341' DOLOMITE BRICK

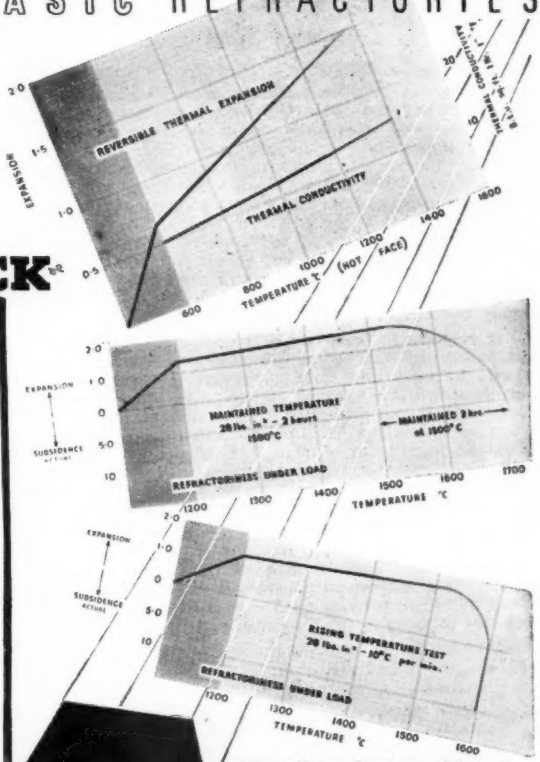


ELECTRIC FURNACES G.R. '341' dolomite bricks are used extensively in walls and bottoms of basic electric arc furnaces. Proved the most economic basic brick available. Complete absence of chromic oxide makes '341' most suited for production of chromium-free alloys. Any size furnace can be lined from standard stock sizes.

BASIC BESSEMER CONVERTER G.R. '341' bricks, dense and burnt to vitrification at high temperatures are superior to rammed tarred dolomite or 'green' tarred blocks in the lower wall positions. In addition to giving much longer and uniform life to the converter the efficiency of the process is greatly improved. Highly resistant to chemical erosion and mechanical attrition.



DESULPHURISING LADLES G.R. '341' bricks provide the perfect lining and solve completely the refractory problems connected with sulphur removal by the sodium-carbonate process. Give a life 8 to 10 times longer than firebrick without patching or attention. A perfect chemical (basic) medium which in addition to longer lining life increases efficiency of process.



The widespread and successful use of the G.R. '341' dolomite brick in Basic Electric Furnaces, Bessemer Converters and Desulphurising Ladles is one of the major achievements in refractories. G.R. '341', the result of many years research and experimentation, is manufactured entirely from British Dolomite and is treated to ensure resistance to atmospheric moisture. Like all G.R. Basic Bricks, '341' is made in one of the most modern plants, embodying all the features of improved brickmaking technique and possessing valuable characteristics developed by years of experience. Full information and advice on the selection and application of refractories will be given on request.

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Raw Material Markets

Iron and Steel

The output of pig-iron is steadily rising. September production has only once been exceeded in the past 12 months and that only slightly. Nevertheless, the call for iron still exceeds the supply and more material is being imported to bridge the gap. Since most of the heavy imports of iron ore are obtained from soft-currency areas, it is not anticipated that there will be any curtailment and, in any event, good stocks have been accumulated at the blast furnaces. Coke is also rather more plentiful and the gradual expansion of pig-iron production should not be interrupted by any lack of raw materials. The greater need is for more high-phosphorus iron, production of which is very largely concentrated in the Midlands.

The pressure for steel semis is appreciably relaxed. It is estimated that about 200,000 tons have been taken into stock and it is a reasonable assumption that there will be a rapid shrinkage in the imports from Belgium and elsewhere. A few months ago re-rollers were anxious lest the operation of the mills should be interrupted through lack of material; now their chief concern is to secure orders to absorb their outputs. Competition is keen and producers of small bars and light sections are hoping to handle more export business under the various bilateral trade agreements.

A steady flow of specifications is maintained to the heavy rolling mills, and these will be sufficient to sustain full-scale activity until the end of the year. Plate-mill capacity is fully engaged and, in fact, over-weighted.

Non-ferrous Metals

The Minister of Supply, Mr. G. R. Strauss, announced at question time in the House of Commons on Monday that dealings in tin would be resumed on the London Metal Exchange on November 15. With regard to copper, lead, and zinc, the Minister said he had nothing to add to the reply he gave to a question on July 11. In July Mr. Strauss stated that the Government had decided not to reopen the Metal Exchange for dealings in copper, lead and zinc. Abandonment of bulk buying of these metals from Commonwealth countries, he explained, would seriously endanger the United Kingdom's supplies from those sources and would make the country more dependent on dollar purchases.

The following is the basis on which the Ministry of Supply will during the period from September 19 to the opening of the metal market on November 15 continue to purchase Malayan tin (*i.e.*, tin smelted from ore delivered to the smelters and priced during the period) and Nigerian ore. So far as sales of Malayan tin during the period match the intake, the Malayan smelters and producers will get the benefit of the actual selling price—*e.g.*, on the current selling price of £739 a ton ex smelter Penang and Singapore, the smelters will get £728, the difference representing the Ministry's warehousing interest charges, etc.

To the extent, if any, that intake exceeds sales so that the Ministry has to increase its stocks of Malayan tin, the smelters will be paid at the price ruling before September 19—*i.e.*, £553 10s. a ton. It is the intention of the Ministry to see that any release of its stocks takes place in an orderly manner with due regard to the need for reasonable price stability for tin.

Pending determination of the final price to the smelters in the above manner, an interim payment of 80 per cent. of the smelters' share of the current selling price—*i.e.*, at present £582 10s. a ton—will be made. The balance will be payable to the Government of the Federation of Malaya for distribution to the industry after deduction of taxation.

A similar arrangement by reference to intake and sales of English tin is being made for the purchase by the Ministry of Nigerian concentrates during the period, the 80 per cent. interim payment, based on the present United Kingdom selling price of £750 a ton, being £567 a ton of tin in ore f.a.s. Nigerian port.

Statistics published by the American Copper Institute encourage the view that the copper situation in the United States is good. Production of blister copper amounted to 64,237 short tons, compared with 62,569 tons in August, while the output of refined copper showed a fall, from 85,577 tons in August to 79,949 tons in September. The most striking feature of the monthly review, however, was the tonnage of deliveries to domestic consumers, whose takings rose from 90,739 short tons in August to 103,115 tons last month. If the rate of buying is any guide, deliveries in October should be on as good a scale as September. Not surprisingly, in view of the gap between production and deliveries, stocks in producers' hands were reduced from 217,167 short tons at the end of August to 193,890 tons at September 30. Nevertheless, the tonnage on hand must be regarded as ample, for imports of foreign copper are on a big scale.

Further weakness in the U.S. lead quotation to 13 cents per lb. has prompted the Ministry of Supply to cut its selling price by £6 to £105, so that in the course of rather less than four weeks the United Kingdom quotation has fallen by £17. This is approximately half the original advance when devaluation occurred and the outlook is not very bullish. Demand in America is reasonably good, but there has been something of an influx of foreign lead into the country, the bulk of it emanating from the Continent. Doubtless these sales of lead have been prompted by the desire to acquire dollars, and the fact that this metal has come in despite the import duty is a matter which is probably causing U.S. lead producers a certain amount of concern. Outside America, however, lead is by no means in over-supply, and although stocks in the U.K. are reasonably good, the allocation scheme continues. But the continued need of this arrangement may well be queried, for the high price is certainly checking usage.